SC-2-D

REMEDIAL ACTION MASTER PLAN

SCIENTIFIC CHEMICAL PROCESSING SITE
CARLSTADT TOWNSHIP
BERGEN COUNTY, NEW JERSEY

EPA WORK ASSIGNMENT
NUMBER 01-2V65.0
CONTRACT NUMBER 68-01-6699

RAI PROJECT NUMBER 830431-01
NUS PROJECT NUMBER 0701.30

JANUARY 1984

PREPARED BY RESOURCE APPLICATIONS, INC.
UNDER SUBCONTRACT TO NUS CORPORATION

Resource Applications, Inc.
Engineers — Scientists — Planners

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Introduction

This Remedial Action Master Plan (RAMP) is prepared in accordance with the guidance of the National Contingency Plan (NCP) (47 FR 137, July 16, 1982), published pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). It serves as the basic planning document for the following actions:

- Scoping decision by EPA or other lead Federal agency in requesting funds for remedial response activities
- Cooperative agreement or contract between EPA and the State of New Jersey for planning and implementing remedial response activities
- Future remedial response and enforcement activities

The RAMP contains three major sections: (1) compilation of existing data contained in Section 2.0 and 3.0; (2) evaluation of data, in Sections 4.0, 5.0, and 6.0; and (3) remedial actions in Sections 7.0 and 8.0. Site chronology, work plan outlines, and breakdown of cost estimates are appended. The information contained in this document is based entirely on existing data obtained from the files of the U.S. Environmental Protection Agency (EPA) - Region II, the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Attorney General's Office, and the U.S. and New Jersey Geological Surveys.

The Site

The Scientific Chemical Processing Site (SCP Site) is located in a filled-in marsh known as the Hackensack Meadows in Carlstadt Township, Bergen County, New Jersey. It is bordered by Paterson Plank Road, Gotham Parkway, another industrial site, and Peach Island Creek. The site is enclosed on the first three sides mentioned by a chain link

fence. Five small buildings, some old chemical process equipment, and old tanks and tank trailers containing hazardous substances occupy about half of the 5.9-acre site.

The site has been used for chemical processing and recovery of industrial wastes between 1971 and late 1980, when operations were suspended by court order because of poor housekeeping practices by the site operators. The recovery equipment included a thin-film evaporator and a fractionating column. The hazardous substances stored on the site include solutions and mixtures of fuel oil, sodium sulfate, phosphoric acid, methanol, solvents, and thinners.

Environmental Setting

The site is located on a filled-in section of the Hackensack Meadows, at about 8 to 10 feet above mean sea level. It is bounded on the northeast side by the Peach Island Creek, which flows into Berrys Creek Canal, into the Hackensack River, and eventually, into the Atlantic Ocean at New Jersey Bay.

The underlying strata are known as the Brunswick Formation, a part of the Upper Triassic Newark Group. The formation consists of red shale, red sandstone, and conglomerate. The 6,000 to 16,000 foot-thick Brunswick Formation bedrock is overlain by a thick (approximately 290 feet) deposit of clay interspersed with thin beds of sand and gravel. The fill cover consists of organic silt. Groundwater occurs primarily in horizontal fractures in the rock and is free to move in all directions, determined by the fractures. The water table is located in fill only five feet below the ground surface.

Groundwater is the principal source of drinking water for the 21,000 people who live within a three-mile radius of the site. Several wells have been shut down because of organic contamination. The nearest well is only 4,000 feet from the site. There is no evidence of surface water being used for either drinking or irrigation. The Hackensack River is used for recreation and crabbing.

The average monthly temperature at the nearest weather station, at Newark International Airport, ranges from 36°F to 78°F, for an annual average of 59.9°F. The average annual precipitation is 41.4 inches.

Environmental Concentrations

There have been no reliable measurements of concentrations of hazardous substances in the environment of the SCP Site. However, visual observations of substantial spills on the ground and into the adjoining creek indicate likely contamination of the soil, groundwater, and creek sediment.

Extensive collection of environmental quality data will be required to determine the extent of contamination, and thus, the seriousness and immediacy of any hazard to the public health and environmental quality, and the magnitude and cost of cleanup operations.

Public Health Concerns

The SCP Site reportedly contains approximately 300,000 gallons of hazardous substances in 34 large tanks, 12 tank trailers, and over 40 drums. Most of these substances are toxic, carcinogenic, flammable, and/or reactive. Some of the containers have been leaking their contents onto the ground. The spilled substances may have percolated into the soil and groundwater or have been carried by the runoff into the adjoining stream. Uncontrolled spills and surface water contamination caused the State of New Jersey to shut down the SCP, Inc., operations in October 1980.

The primary health concern associated with the SCP Site is potential contamination of the groundwater, which serves as a source of drinking water for the surrounding community. The surface water, which is likely to contain high levels of contamination, is not used for either drinking or irrigation. However, consumption of fish from the local streams could pose a health hazard.

There is also a potential hazard of vapor inhalation as well as fire and explosion. Smoke from a fire would pose a serious inhalation hazard for the population downwind from the site.

Health and Safety Procedures

Previous inspections of the site did not involve the use of special personal protective measures. Level D measures, involving coveralls, gloves, shoe coverings or boots, and organic vapor detectors, are recommended for future inspections. Collection of samples will probably require Level C protection, and implementation of remedial measures might require even higher levels of personal protection.

Remedial Planning Recommendations

The general objectives of remedial measures at the SCP Site are to reduce the potential hazard to the public health and environmental quality by removing and disposing of the hazardous substances stored there and by containing or cleaning up any contamination of soil, groundwater, and creek sediment. The remedial planning activities discussed at length in this document are initial remedial measures, remedial investigation, and feasibility study. Subsequent activities, including remedial design, remedial implementation, and post-closure maintenance and monitoring, are noted here briefly and will be addressed in more depth in the feasibility study.

Initial remedial measures are designed to limit any significant threat to public health or environmental quality, even as the long-term remedial measures are being considered. They are typically more apparent, more readily implementable, of shorter duration, and less costly than the long-term measures. Initial remedial measures planned for the SCP Site are as follows:

- Post warning signs around the site
- Sampling and removal of hazardous materials.

Long-term remedial measures may be categorized as either source control or offsite remedial measures. The former are designed to prevent or mitigate the migration of hazardous substances to the environment of the site, whereas the latter serve to mitigate the impact of any hazardous substances that have migrated from the site.

The following source control measures should be considered:

- Remove and dispose of substantially contaminated soil
- Remove and dispose of any buried containers
- Emplace impermeable barriers
- Control runoff and infiltration

If it is determined that hazardous substances have migrated from the site, offsite remedial measures will be considered. These measures include the following:

- Treatment or replacement of contaminated groundwater supplies
- Dredging and disposal of contaminated creek sediment.

A remedial investigation and feasibility study are required for the design and implementation of both the initial and the long-term remedial measures. The objectives of the remedial investigation are to characterize the site, the hazardous substances, the environmental setting, the extent of contamination, and the potential receptors in sufficient detail to permit the performance of a thorough feasibility study. The objectives of the feasibility study are to identify and evaluate alternative remedial approaches and measures for each phase of remedial activities, to select the preferred approach and measures, and to develop a conceptual design for the preferred measures.

Schedule and Cost Summary

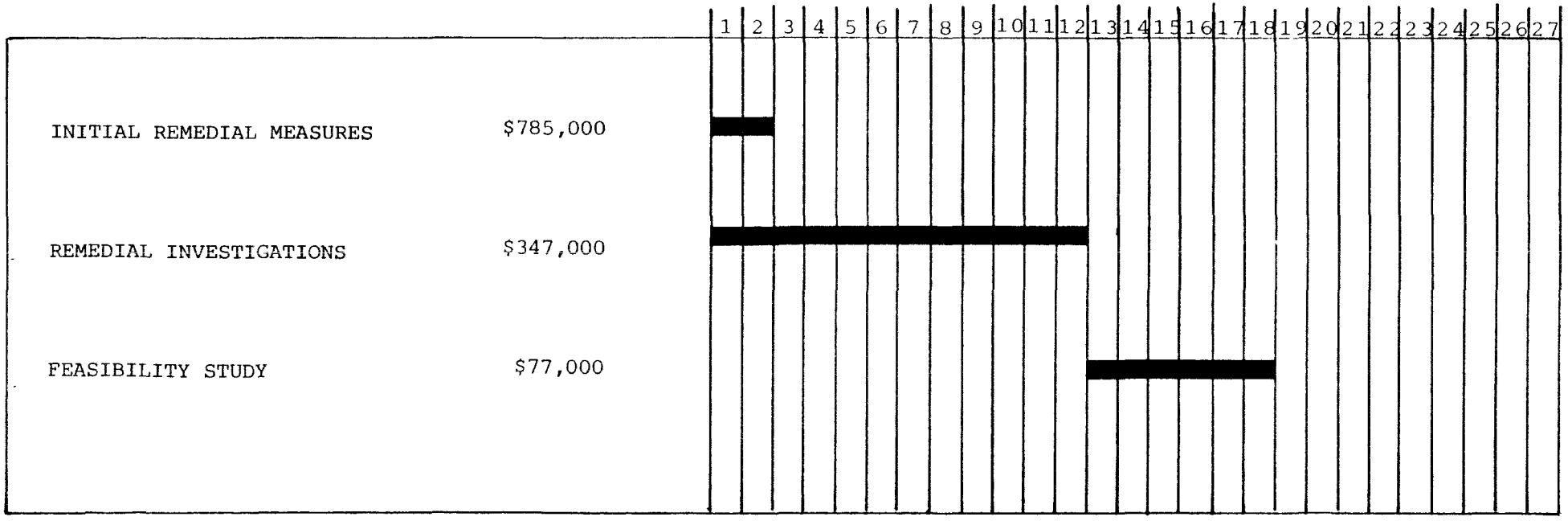
Preliminary estimates of the costs and schedule of performance for the initial remedial measures, the remedial investigation, and the feasibility study are presented in Figure ES-1. Estimates of costs and schedule for subsequent remedial activities will be developed as part of the feasibility study.

The proposed schedule assumes completion of initial remedial measures before a final commitment is made to proceed with the remedial investigation and feasibility study. The remedial investigation and feasibility study must be completed before long-term remedial measures are implemented. Actual costs may differ substantially from the estimates reported here because of site conditions uncovered in the course of the remedial investigation.

Community Relations

The concerns of local residents and business leaders are presently expanding. There is concern for the safety of those traveling and working near the site because of the flammability and explosivity of chemicals that have been handled at the plant. There is also concern for the water quality of a nearby stream that was used for plant discharges, and there is concern for the impact of runoff and plant spills on groundwater quality.

A further and overlapping concern is for the safety of spectators and participants--including animals--at the sports complex located near the site.



COSTS DO NOT INCLUDE CLP ANALYTICAL COSTS

FIGURE ES-1. COST AND SCHEDULE SUMMARY
THE SCIENTIFIC CHEMICAL PROCESSING SITE, CARLSTADT, NEW JERSEY

1.0 INTRODUCTION

This RAMP is prepared in accordance with the guidance of the NCP (47 FR 137, July 16, 1982), published pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980. Remedial actions are those responses to sites on the Proposed National Priorities List that require long-term efforts consistent with permanent site remedy to prevent or mitigate the migration of hazardous substances. The specific aspects of remedial actions are presented as Phase VI, Section 300.68 of the NCP.

The RAMP will be the basis of a scoping decision to be made by the lead Federal Agency (EPA or other agency) for requesting funding for the remedial actions, feasibility studies, and other onsite or offsite remedial actions. In addition, this RAMP and subsequent revisions will serve as the basis of the workscope under the U.S. EPA-State cooperative agreements or contracts and as the primary planning document for all remedial action activities at the site and for related enforcement activities.

RAMPs are prepared exclusively from existing information. This information may include sampling data; maps and topographic information; generator, hauler, and site operator records; and, previous regulatory and remedial actions.

This RAMP contains three major sections: (1) compilation of existing data contained in Sections 2.0 and 3.0; (2) evaluation of data, Sections 4.0, 5.0, and 6.0; and (3) remedial actions, Sections 7.0 through 8.0. A site chronology, work plan outline, and other pertinent information are appended.

2.0 THE SITE

2.1 Location

The Scientific Chemical Processing Site (SCP Site) is located at 216 Paterson Plank Road in Carlstadt Township, Bergen County, New Jersey, and at latitude 40° 49' 30" N, longitude 74° 04' 28" W. The site is a corner property, bounded by Paterson Plank Road on the south, Gotham Parkway on the west, and by Peach Island Creek on the north. The general topography of the area is flat. The site location is depicted in Figure 2-1 and 2-2.

2.2 Site Layout

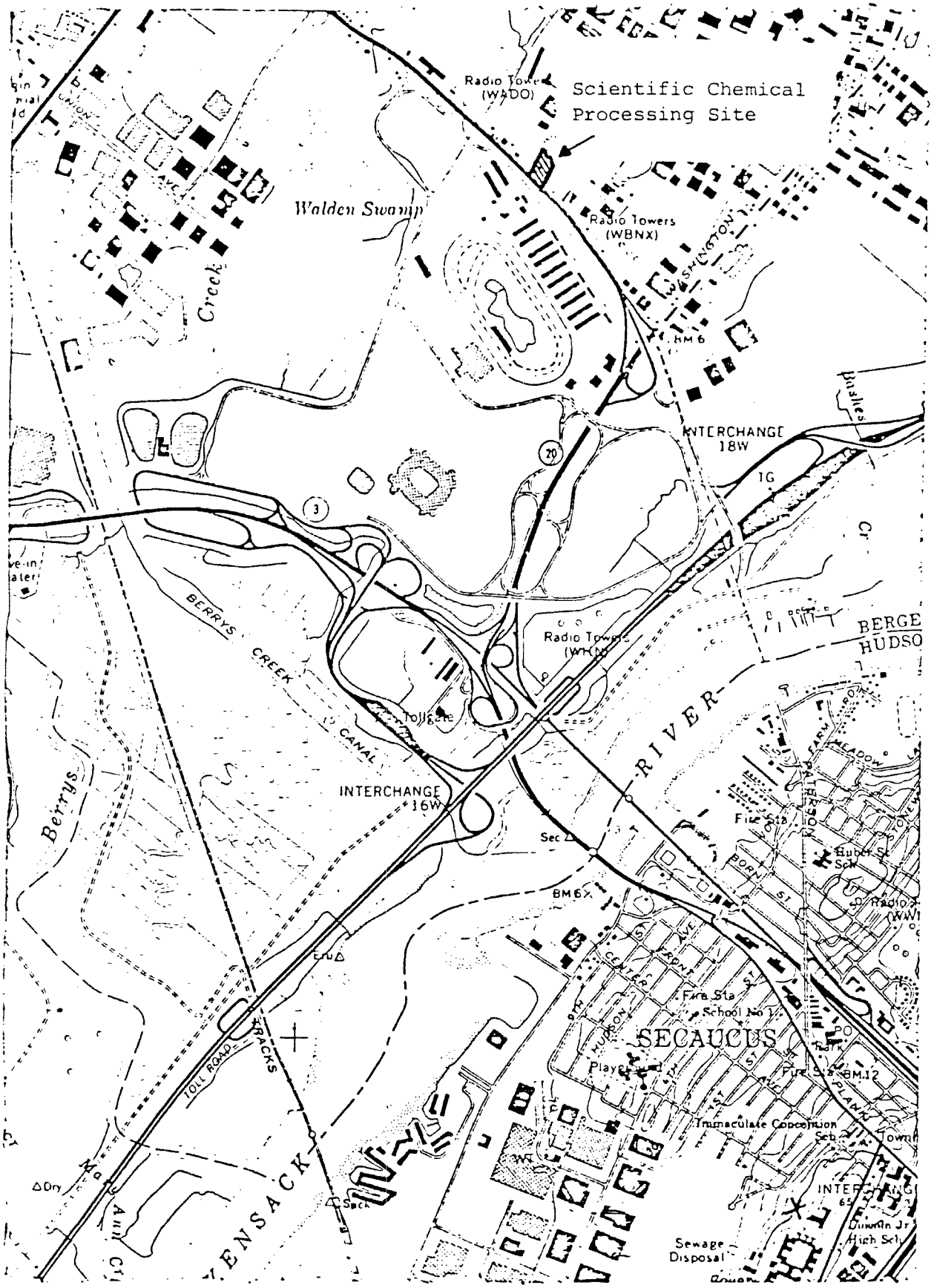
The site occupies an area of approximately 5.9 acres situated on a fill in Hackensack Meadows. Light industrial development is located to the north and east of Peach Island Creek. The site is fenced on three sides. There are three buildings at the site -- one old chemical processing plant, an abandoned storehouse, and a small office building located at the entrance from Paterson Plank Road. On the northern portion of the site, there are batteries of tank trailers, tanks, and drums containing hazardous materials.

2.3 Site History

The site is owned by Scientific Chemical Processing, Inc. (SCP). The company was incorporated in the State of New Jersey on December 10, 1970. The site was used for recycling industrial wastes from 1971 until it was shut down by court order in October 1980.

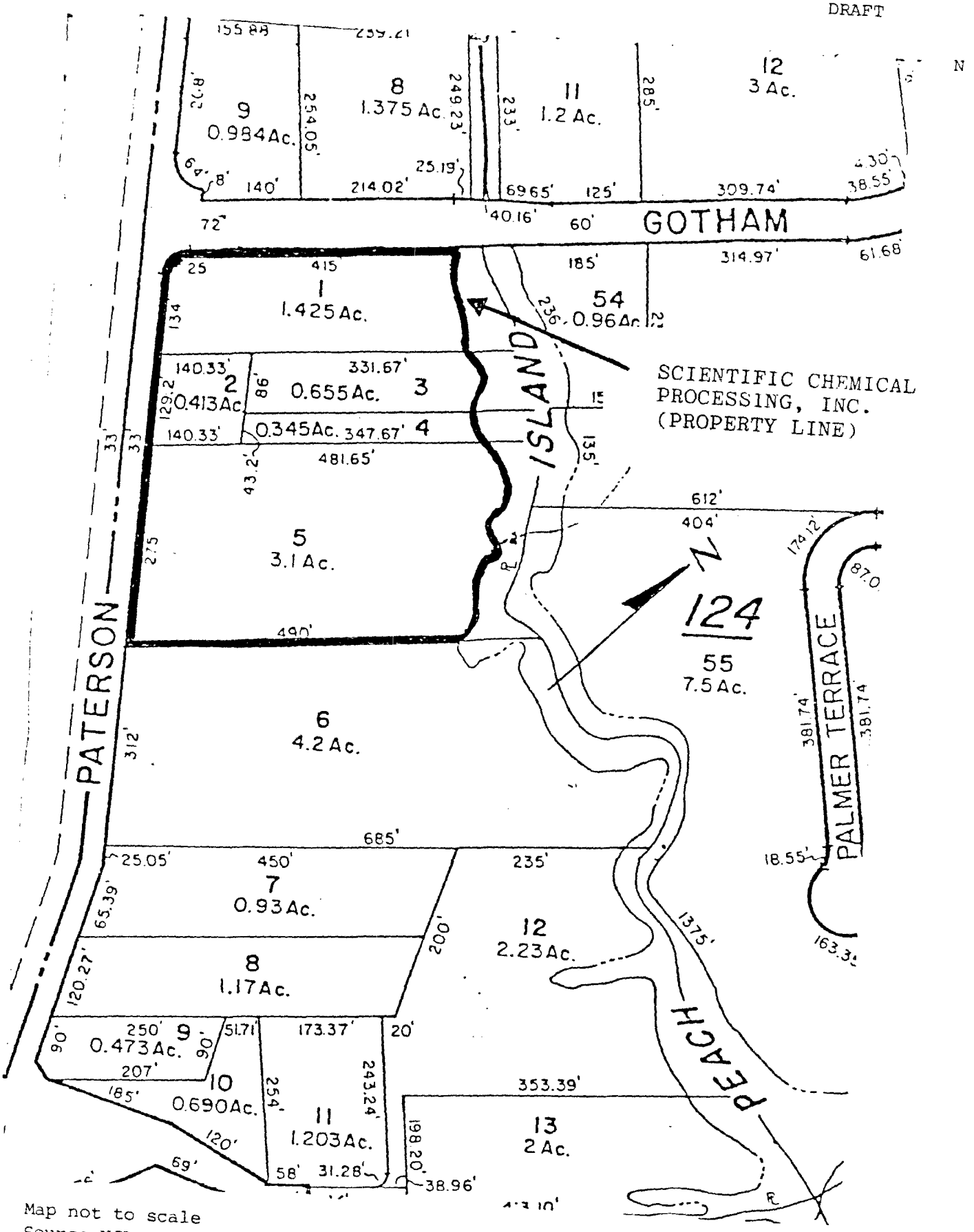
While in operation, the facility received liquid wastes (primarily hydrocarbons) from chemical and other industrial manufacturing firms in the area, then processed the wastes to reclaim marketable products. Methanol was one of the prime recoverables (Reger, 1983).

Other liquid hydrocarbons were processed to some extent, then blended with fuel oil, and the mixtures were typically sold back to the originating company as boiler fuel. Major process equipment



Base Map is a portion of the U.S.G.S. Weehawken Quadrangle, New Jersey - New York (7.5 Minute Series, 1967-Photo Revised 1981) Contour Interval 10 feet

Figure 2-1 Location of Scientific Chemical Processing, Inc. - Scale 1" = 2000'
Carlstadt Township, Bergen County, New Jersey



Map not to scale
Source: NJDEP,

Figure 2-2 SCP Site at Paterson Plank Road and Gotham Road, Carlstadt Township, Bergen County, New Jersey

still located on the site includes a distillation column and a thin-film evaporator.

In addition to the wastes noted above, the site also received other items, including paint sludges and acids, although it is not clear just what was intended in terms of their processing/disposition.

Cessation of operation at the site was ordered by the New Jersey Superior Court in 1980, after a series of spill events in which the company failed to respond with prompt and complete clean-up. It was repeatedly demonstrated that the spills have caused serious contamination in Peach Island Creek (Case, 1980). At the time of the court-ordered shutdown, a substantial inventory of hazardous wastes was stored on the site. Over 300,000 gallons of hazardous substances in quantities ranging from 3,000 to 20,000 gallons (Ianuzzi, 1982).

2.4 Potential Sources of Contaminants

Chemicals, which are stored in tanks and tank trailers at the site, are the source of contamination. From previous site investigations by the NJDEP inspector, it is apparent that chemicals from the damaged containers had been in contact with the ground, and had either run off or leached into Peach Island Creek (Case, 1980). Sampling data also indicate contamination of air and soil. Although no groundwater samples have been taken and analyzed for priority pollutants, it is possible that groundwater is contaminated because of spillage at the site.

2.5 Response Actions to Date

Under court order, SCP has retained the services of an engineering firm to prepare a remedial action plan for cleaning up the site. This report was due in the New Jersey Superior Court by July 1, 1983. Since the site was ordered shut down in October 1980, SCP has made no effort to clean up the site.

3.0 ENVIRONMENTAL SETTING

3.1 Landforms

The site is located in a fill in Hackensack Meadows at about 8 to 10 feet above mean sea level. Surface runoff drains toward the northeast into Peach Island Creek.

3.2 Surface Water

The site is bounded on the northeast side by Peach Island Creek. The creek is about 3,000 feet long, flows generally from east to west, and eventually joins Berrys Creek Canal approximately 1,500 feet northwest of the site (U.S. Geological Survey, 1981). Berrys Creek Canal joins the Hackensack River approximately 2 miles downstream from its confluence with Peach Island Creek. The Hackensack River enters the Atlantic Ocean in the New Jersey Bay approximately 7 miles south of the site.

3.3 Geology and Soils

The SCP Site is located in the Piedmont Physiographic Province. The common geology of the Piedmont Plateau belongs to the Upper Triassic Period of the Newark Group (Subitzky, 1969, and Herpers and Barksdale, 1951). The sedimentary rocks of this group form the broad Piedmont Plain which slopes toward the southeast. The Newark Group has been divided into the following lithologic units:

- Brunswick Formation
- Lockatong Formation
- Stockton Formation

The bedrock at the SCP Site is the Brunswick Formation, which is the youngest formation in the Newark Group. The strata of the Brunswick Formation are well exposed at higher elevations of 150 to 200 feet. The Brunswick Formation, which ranges from 6,000 to 16,000 feet in thickness, dips gently toward the northwest. The strata exhibit occasional faulting and variable fracturing, both laterally and vertically. The chief rock units in the Brunswick Formation are red sandstone

and shale, with some conglommerate. The red color of the sediments and the fossils found in them indicate terrestrial and lacustrine environments of deposition.

In the eastern parts of Newark and Bergen County, the Triassic and older formations are overlain by Quaternary fluviatile sediments of the Hudson River. The Hackensack Meadows were formed by glacial erosion and drainage disruption (New Jersey Geological Survey, 1974).

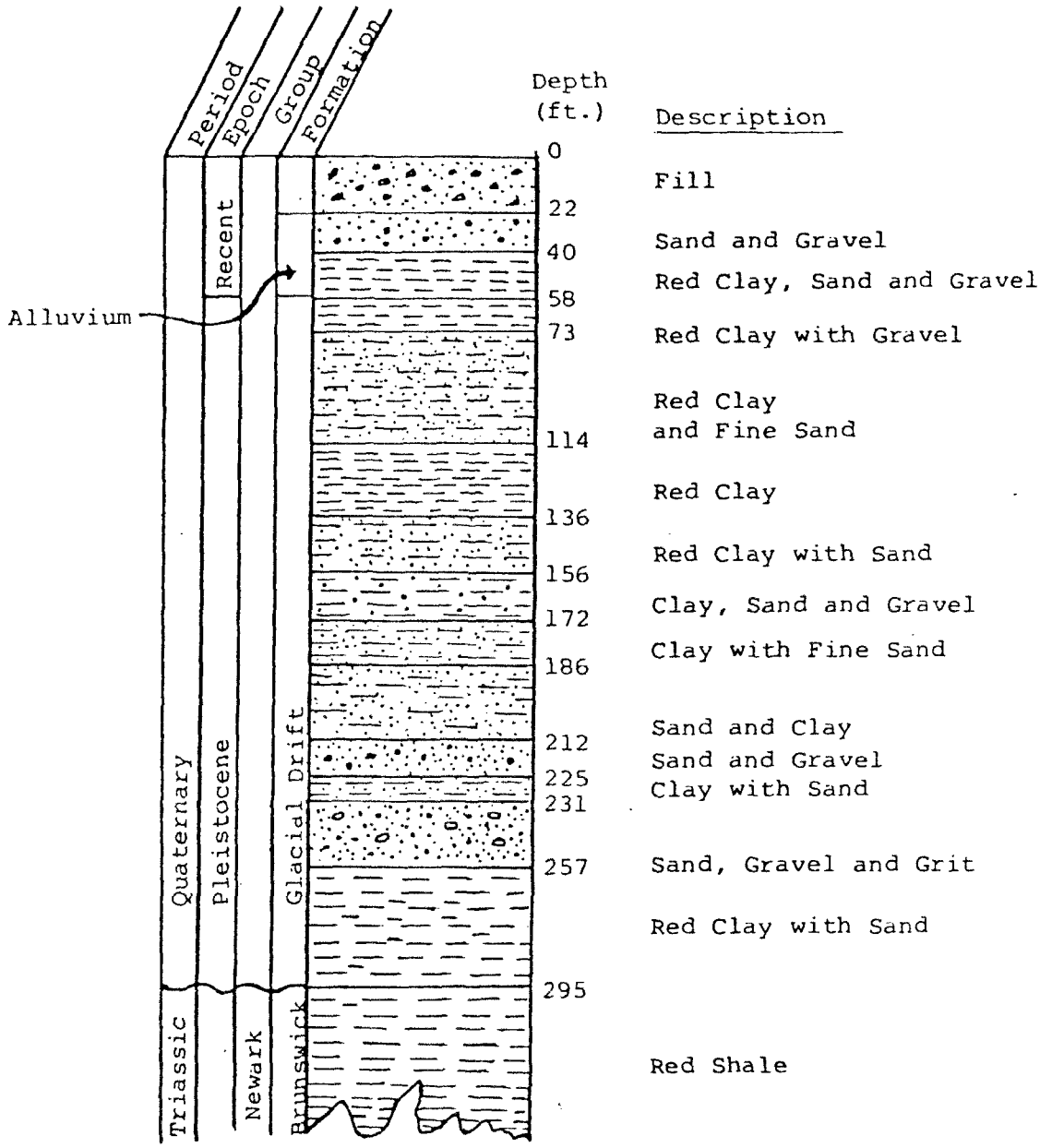
The Watchung Basalt lava flows intruded the shale and sandstone of the Brunswick Formation, forming a sill of up to 900 feet in thickness. This sill is exposed as the Palisades along the Hudson River in eastern Bergen County.

Overlying the rocks of the Brunswick Formation is a repetitive sequence of clay, sandy clay, sand, and gravel deposited during the Pleistocene Epoch. The thickness (250 to 300 feet) and locations of the Pleistocene deposits are largely controlled by the underlying bedrock topography. A relatively thin veneer (20 feet) of Recent sands and gravels overlie the Pleistocene sediments. The table below represents the general stratigraphic sequence of the rock units at the SCP Site, as well as adjoining areas, with the most recent deposits at the top (Subitzky, 1969, and Herpers and Barksdale, 1951). This stratigraphic sequence is shown as a column in Figure 3-1.

Stratigraphic Table in the Area of the SCP Site

Quaternary Period	Recent Deposits	Fluviatile sediments
	Pleistocene Deposits	Glacial till and other glacial deposits
Upper Triassic Period	Brunswick Formation	Shale, sandstone, and lava flows

The clay, sand, and gravel are part of the Pleistocene deposits. The red shale of the Brunswick Formation underlies the Pleistocene deposits at a



Source: New Jersey Geological Survey and U.S. Geological Survey

FIGURE 3-1 Generalized Stratigraphic Section, Vicinity of Scientific Chemical Processing Site, Carlstadt, Bergen County, New Jersey

depth of about 295 feet. The unconsolidated materials consist primarily of clay and sandy clay, with with a few thin sand and gravel beds. Bedrock consists of red shales and sandstones, and may contain basalt intrusions.

The soils in the area are podzol type. The general soil series are made up of clay loam, sandy loam, and silty loam (Subitzky, 1969).

3.4 Groundwater

There is no site-specific data available concerning the hydrogeology. The two major aquifers in the area are the Triassic age Brunswick Formation and the Quaternary age stratified drift along river channels (Widmer, et al., 1966). The Brunswick Formation yields water from the fractures in the rock; the rock itself is relatively impervious. There is considerable variation in the fracture frequency from one location to another, and thus in groundwater yield. Fracturing decreases with depth and most of the groundwater is produced by the upper, highly fractured part of the formation.

There is no discernable regional groundwater flow direction (Herpers and Barksdale, 1951). The fracturing is believed to have been caused by the regional tilting of the Brunswick Formation to the northwest. One would expect a regional fracture pattern and of groundwater flow within the fractures, but geologists of the New Jersey Geological Survey do not believe this to be the case. Groundwater apparently moves in any direction, based primarily on the degree of fracturing and the local hydraulic gradient.

The primary sources of groundwater are the Pleistocene and Recent deposits are the major aquifers when there are thick, well-sorted accumulations, as in the major river valleys. Local variations in groundwater level are caused by variations in topography, vegetation, and soil conditions which affect recharge. The occurrence of groundwater at the SCP Site and its localized flow direction are uncertain, due to the limited sources of information on groundwater in Bergen County.

3.5 Climate and Meteorology

The average monthly temperature and precipitation figures for the

Newark (NJ) Meteorologic Station are given below. The station is located at Newark International Airport, about 6 miles from the SCP Site. The site is approximately 15 miles inland from the Atlantic Ocean (National Oceanic and Atmospheric Administration, 1983).

Month (1982)	Temperature (°F)	Rainfall (inches)
January	-	-
February	36.2	2.36
March	41.8	2.82
April	50.6	6.20
May	63.2	2.96
June	67.9	5.28
July	78.4	2.86
August	72.5	2.78
September	66.7	2.39
October	56.9	1.68
November	48.8	3.16
December	42.8	1.32
	56.9 (average)	33.77 (Total)

The mean annual evapotranspiration rate for the area is 25 inches. Thus, based on the above rainfall data, the net precipitation is approximately 9 inches per year. The prevailing winds are northwesterly and normally range from 8.7 to 12 miles per hour over the year.

3.6 Land Use

The SCP Site is located in Carlstadt Township, New Jersey. About 6,000 people live within a one-mile radius (Unnamed Author, Undated). One luncheonette and a diner are located about 300 feet from the Site (Unnamed Author, Undated). Additionally, there is a major sports stadium and a race track within one mile of the site. No agricultural land or historic landmarks are located within a one-mile radius.

3.7 Water Use

3.7.1 Surface Water

Peach Island Creek has been designated as Freshwater-2 (FW-2) by NJDEP (Kaplan, Undated). FW-2 criteria state that such waters should "be suitable for maintenance, migrations, and propagation of the natural ecosystem and support biota." Peach Island Creek joins Berrys Creek Canal, which eventually discharges into the Hackensack River. The Hackensack River is used for recreational purposes and crabbing (Kaplan, Undated, and U.S. Department of the Interior, Undated). There is no evidence that waters from the creeks and the river are used either for human consumption or irrigation purposes.

3.7.2 Groundwater

There are about 21,000 people who live within three miles of the site (Unnamed Author, Undated). The primary source of water supply for this population is groundwater (NJDEP, Division of Water Resources, Undated).

The nearest well is located about 4,000 feet from the site. The aquifers serving the population are stratified drift and the sandy layers of glacial till (Unnamed Author, Undated). Five (5) wells in Wallington (about 3 miles to the northwest), have recently been shut down due to organic contamination (Unnamed Author, Undated). The exact locations of these wells are not known. These wells served a population of about 11,000.

At the site itself, no groundwater monitoring program has been initiated.

4.0 ENVIRONMENTAL CONCENTRATIONS

There are no reliable data on concentrations of hazardous substances in the environment of the SCP Site. Concentrations in all of the environmental media need to be measured to permit assessment of the extent of contamination, the seriousness and immediacy of the threat to public health and environmental quality, and the magnitude and cost of the cleanup effort.

4.1 Environmental Concentrations

There are no reliable data on concentrations of hazardous substances in the air, soil, groundwater, surface water, sediment, or biota in the immediate proximity of the SCP Site. Analytical results of single samples of creek water, cooling water discharge, a spill, and a sludge accumulation are considered of no quantitative value, because few samples were collected and no regular sampling program was undertaken. Table 4-1 lists pollutant concentrations found in one set of samples collected by NJDEP inspectors while the SCP plant was still in operation. These results and visual observations by NJDEP inspectors of spills on the ground and in Peach Island Creek during a number of site inspections while the plant was in operation, indicate possible contamination of the soil, groundwater, and creek sediment. A more comprehensive list of compounds found is presented in Section 5.1.2.

4.2 Adequacy of Existing Data Base

Concentrations of hazardous substances in the environment of the site need to be measured to permit assessment of the extent of contamination, the seriousness and immediacy of the threat to public health and environmental quality, and the magnitude and cost of the cleanup effort. The specific objectives of measurements in each medium are noted below:

TABLE 4-1
POLLUTANT CONCENTRATIONS FOUND IN SAMPLES
COLLECTED AT SCP SITE, CARLSTADT N.J.

	Sample Source		
Substance	Sludge Floating on Peach Island Creek (ppb)	Sludge on Creek Ice* (ppm)	Spills Near Thin-Film Evaporator (ppm)
Benzene	42	5.0	650
Chloroform	250	-	-
Methyl Ethyl Ketone	-	52.0	800
Styrene	-	4.0	50
Tetrachloroethylene	45	12.0	200
Toluene	1250	8.8	1800
Trichloroethane	-	4.3	400
Trichloroethylene	200	26.0	400
m-xylene	420	8.4	210
o-xylene	175	1.16	66

*Peach Island Creek Partially Frozen Over

Source: Cahayla-Wynne and Tan, January 19, 1979.

Medium	Objective
Air	Locate contamination areas, and obtain data necessary to determine needed mitigation of inhalation hazard to field personnel and the public.
Drinking Water	Determine seriousness of near-term threat to public health.
Groundwater	Determine type and extent of groundwater contamination.
Soil	Determine type and extent of soil contamination from known or suspected areas of soil contamination. Determine seriousness of threat to groundwater quality and cost of cleanup.
Sediment	Determine seriousness of long-term threat to surface water quality and cost of cleanup. Determine whether contaminants are released to surface water or retained in sediments.
Biota	Determine the effect of the site on local fauna and flora.

5.0 PUBLIC HEALTH CONCERNS

The chief public health concerns associated with the SCP Site are the threat of direct skin contact and vapor inhalation by field personnel and other visitors to the site; the threat of contamination of public water supplies and surface waters; and the threat of explosion and fire, and the resulting environmental pollution.

5.1 Hazardous Substances

Approximately 300,000 gallons of hazardous substances are contained on the SCP Site in tanks, tank trailers, and drums.

5.1.1 Location on Site

The SCP Site was used until October 1980 for processing, storage, and transfer of a number of hazardous substances, including mixtures and solutions of fuel oil, sodium sulfate, phosphoric acid, methanol, and thinners. Most operations were conducted in three sections of the site, which are indicated on the accompanying sketch (Figure 5-1):

- Tank farm
- Still and boilerhouse
- Staging platform and thin-film evaporator.

However, other sections of the site exhibit soil discoloration or other evidence of past use and spills as well.

The tank farm contains 18 tanks. It has an unlined containment area that is depressed one to two feet with respect to the surrounding surface elevation. The structural integrity of these tanks is suspect. Streaks of discoloration on the sides of several of them appears to indicate small leaks, and at least two tanks have had several leaks patched with epoxy sealants and makeshift wooden braces.

The drum storage areas are now largely vacant, after nearly 4,000 drums were removed to the firm's Newark site sometime between May 1979 and December 1980. Those areas, comprising the southeastern half of the site, are unlined and have no containment provisions.

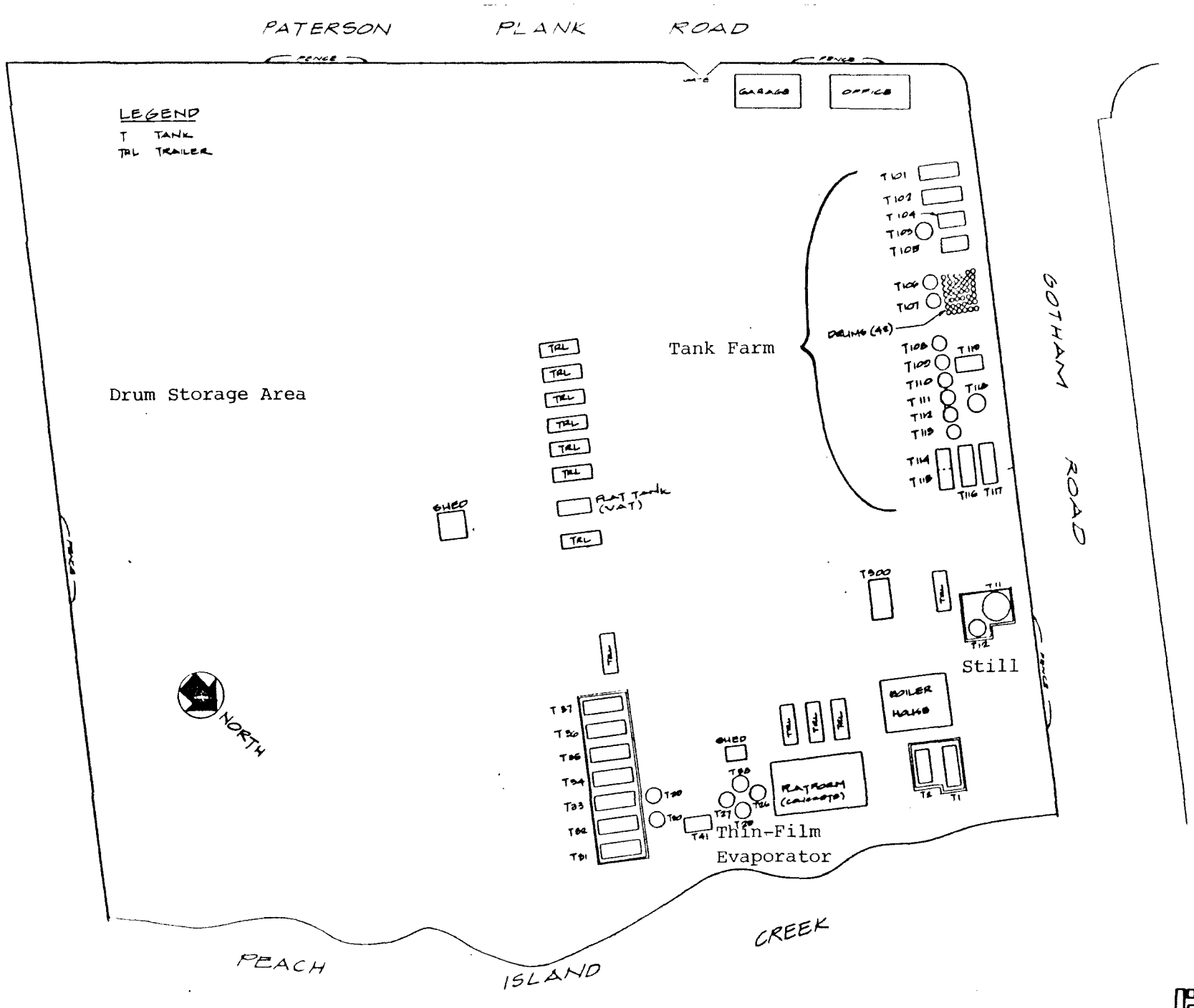


Figure 5-1 Approximate location of tanks and tank trailers on the Scientific Chemical Processing Site, Carlstadt, N.J. (Not to scale)

The still and boilerhouse section of the site contains tank trailers used to feed and receive substances run through the still. The structural integrity of the tanks on the tank trailers is also suspect, with leaks indicated by discoloration, and one trailer tank has been heavily patched with epoxy sealants and makeshift wooden braces. The still is surrounded by a small dike, but the trailer parking slots are not. The ground is covered by stones with a pink coloration that may indicate past spills.

The staging platform was used for transferring and storing wastes. The thin-film evaporator and adjoining small tank farm containing 10 tanks are surrounded by a cinderblock dike which is broken in several places.

5.1.2 Physical, Chemical, and Hazardous Characteristics

The SCP Site contains at least 34 storage tanks, 12 tank trailers, and 42 drums. Most of these contain hazardous substances and many are leaking. The nearly 4,000 drums stored on the site prior to December 1980 exhibited numerous leaks as well (Smajda, 1980, and Cahayla-Wynne and Tan, 1979).

The substances are all in liquid form, with the exception of contaminated soil. They include solutions, emulsions, and suspensions, with some sedimentation likely.

The principal categories of hazardous substances stored on the site, according to the SCP Inventory of December 16, 1980 (Ianuzzi, 1982), are as follows:

- #2 fuel oil
- Fuel, fuel residue, and water mixture
- Sodium sulfate solutions
- Methanol/Phosphoric acid solutions
- Etching solutions
- Solvents and thinners.

The latter encompasses the following compounds detected in several analyses of waste samples (Cahayla-Wynne and Tan, 1979).

- benzene
- carbon tetrachloride
- chloroethane
- chloroform
- ethylbenzene
- ethylacetate
- isopropanol
- methylene chloride
- methylethylene
- methyl ethyl ketone
- methyl isobutyl ketone
- paint and pigment residues
- phenolic resin
- styrene
- tetrachloroethane
- tetrachloroethylene
- toluene
- trichloroethane
- trichloroethylene
- xylenes

The hazardous characteristics of some of these compounds are reported in Table 5-1.

5.1.3 Source, Amount, and Concentrations

The total amount of hazardous substances contained on the site, according to the SCP Inventory of December 16, 1980, is approximately 300,000 gallons. This figure should be reasonably up-to-date, as the operation was closed on October 16, 1980. However, this inventory differs substantially from previous inventories submitted by the company and needs to be verified. These substances were generated by a number of industrial processing and manufacturing firms, including:

- Custom Chemical, Elmwood Park, New Jersey
- Harmon Colors, Haledon, New Jersey
- Plant Food Products, Cranbury, New Jersey (Reger, 1983).

There are no quantitative data on the nature and extent of contamination of the soil, groundwater, and surface water in the vicinity of the site. However, past observations of substantial spills on the site and several measurements indicate possible contamination of all three media.

TABLE 5-1: Hazardous Characteristics of Organic Compounds Detected at the SCP Site

Pollutant	Flammability/Reactivity (of Pure Substances)	Toxicity/Carcinogenicity (of Pure Substances)
Benzene	Highly flammable (flash point = 12°F). Vapor may travel considerable distance to source of ignition and flash back. Can react violently with oxidizing materials. Vapors pose a moderate explosion hazard when exposed to flame.	Acute and chronic toxicity via inhalation and dermal routes. Acute poisoning ($\geq$ 3000 ppm) characterized by narcotic effect on CNS, followed by death through respiratory failure. Chronic toxicity characterized by a variety of symptoms. Recognized leukenogen.
Chloroform	Non-flammable, but will burn on prolonged exposure to flame or high temperature. Generates phosgene (highly toxic, highly flammable, extremely dangerous when exposed to water or steam) when heated or involved in fire.	Highly toxic via inhalation route. Has a narcotic effect. Prolonged inhalation or swallowing may be fatal. Experimental neoplasm former and carcinogen.
Ethylbenzene	Highly flammable (flash point=59°F). Vapor form explosive mixtures with air. Can react vigorously with oxidizing materials.	Acute toxicity via inhalation and oral routes. Irritant to skin, eyes, and mucous membranes. No data on effects of chronic exposure.
Methylene Chloride	Non-flammable but forms flammable vapor and air mixture at about 100°C or higher. Generates phosgene fumes when heated to decomposition.	Moderately toxic via oral, subcutaneous, intraperitoneal and inhalation routes. Very dangerous to the eyes. Induces narcosis and is an experimental carcinogen.
Tetrachloroethylene	Non-flammable. Not corrosive or reactive. Emits highly toxic chlorides when heated to decomposition.	Moderately toxic via inhalation and oral routes.
Toluene	Flammable. Slight fire hazard when exposed to flame or heat. Emits toxic fumes when heated. Can react vigorously with oxidizing materials.	Moderate toxicity via inhalation and oral routes. Low via dermal route. Chronic exposure may lead to anemia and possible bone marrow hypoplasia.
Trichloroethane	Non-flammable. Reacts violently with acetone, N_2O_4, O_2, O_2 liquid, Na, NaOH, and Na-K alloy. Emits toxic chlorides when heated to decomposition.	Moderately toxic via oral route. Has a narcotic effect when inhaled in high concentrations.
Trichloroethylene	Non-flammable. Vapor may decompose into toxic and corrosive substances (chlorides and/or phosgene) at high temperature.	Moderately toxic via inhalation and oral routes. Causes narcosis and anesthesia. Suspected human carcinogen.

Source: Sax, 1979, and U.S. Department of Health and Human Services, 1978.

5.2 Air Pollution

No data are available on air pollution at the SCP Site. Some pollution is expected because of the presence of volatile organic compounds. A fire at the site would pose a major air pollution problem for the local population downwind from the site.

5.3 Soil Contamination

No quantitative data are available on soil contamination at the SCP Site. However, visual observations of substantial spills in the course of several site inspections indicate likely contamination of the soil. Such contamination might pose a threat to the groundwater, which is used as a source of public drinking water.

5.4 Groundwater Contamination

No quantitative data are available on groundwater contamination at the SCP Site. However, visual observations of substantial spills during several site inspections indicate possible contamination of the groundwater. This may present a threat to public health, as groundwater is the sole source of drinking and irrigation water for the local community.

5.5 Surface Water Contamination

No reliable quantitative data are available on surface water contamination near the SCP Site. However, several measurements and visual observations of spills into Peach Island Creek during past site inspections indicate possible contamination of surface water and sediment in the creek. Although surface water is not used for drinking or irrigation, consumption of fish from the creek could pose a health hazard.

5.6 Fire and Explosion

The hazard of fire and explosion at the SCP Site appears to be relatively high, because many of the substances stored there are highly

flammable and reactive and are not adequately protected. Fire and explosion would pose the hazards of blast and heat to field personnel at the site. A major fire would also generate toxic emissions that would pose a substantial inhalation hazard to the local population downwind from the site.

5.7 General Risk Assessment

There is not enough data available for the SCP Site to fully characterize the human health risk. Site observations, data on the types of materials suspected to be onsite, and the population near the site indicate that the potential for public health risk is significant. Exposure routes of greatest concern are groundwater drinking water supplies and fire or explosion. Additional data collection is required to fully assess the environmental and public health impact of the SCP Site.

6.0 HEALTH AND SAFETY PROCEDURES

Previous inspections of the SCP Site apparently did not involve the use of personal protective measures. Dermal protective measures are recommended for future inspections to protect against contact with contaminated soil or waste, and respiratory protection should be used during collection of samples and implementation of remedial measures.

6.1 Personnel Health and Safety Protection

Reports of previous site inspections by NJDEP and other personnel do not indicate the use of any personal protective equipment or procedures. Two individuals reported some temporary dizziness during a site inspection.

Dermal protective measures, involving coveralls, gloves, shoe covers or boots, safety glasses, and an organic vapor detector are recommended for future site inspections. Collection of samples will require respiratory protection, including a full-face, supplied-air respirator and chemical-resistant outer wear. Actual implementation of remedial measues may require even higher levels of personal protection.

6.2 Health and Safety Monitoring

No health and safety monitoring has been performed at the SCP Site. Future monitoring should consist of standard radiation scans and air monitoring to detect the presence of toxic vapors or particulates. Explosimeter and oxygen content readings should be taken in confined areas. Drilling activities, which may contact pockets of wastes and hazardous materials, should be monitored for oxygen content and the presence of organic and explosive vapors.

7.0 REMEDIAL PLANNING ACTIVITIES

This section discusses the remedial activities to be considered for the SCP Site in Carlstadt, New Jersey. Following identification of the initial and long-term remedial measures, the discussion turns to the proposed remedial investigation and feasibility study, then to the delineation of future remedial activities, including remedial measure design and implementation, and post-closure maintenance and monitoring. Preliminary schedule and cost estimates are provided as well.

7.1 Objectives and Criteria

The general objectives of the remedial planning activities are to determine the type and extent of air, soil, surface, water, sediment, and groundwater contamination, and to identify and define the most cost-effective methods to reduce and eliminate the threat to public health and environmental quality posed by the hazardous substances stored and spilled on the SCP Site. These substances include mixtures of fuel and heating oil; solutions of sodium sulfate, phosphoric acid, and methanol; and assorted mixtures of solvents and thinners. Key problems at this site are a high (5 feet) water table and nearby (4,000 feet) water supply well.

Remedial action activities generally encompass the following phases:

- Initial remedial measures
- Remedial investigation
- Feasibility study of long-term remedial measures (including source control and offsite)
- Design of long-term remedial measures
- Implementation of long-term remedial measures
- Post-closure maintenance and monitoring.

Preliminary outlines for the first three phases are presented in Appendix B.

Initial remedial measures are short-term, more apparent, and less costly measures designed to reduce the immediate threat to public health and environmental quality. In the present case, they include posting of the site; spill control; precise identification, removal, and disposal of all highly flammable substances stored above the ground surface; and preliminary runoff control.

Long-term remedial measures are the more deliberate, extensive, and costly measures designed to reduce and eliminate any long-term adverse impacts of the hazardous substances stored and spilled at the site on public health and environmental quality, including contamination of soil and groundwater. These measures may be categorized as source control remedial measures, which deal with contamination of the site itself, and offsite remedial measures, which deal with contamination of offsite soil, aquifers, or surface waters.

Implementation of long-term remedial measures is usually preceded by a remedial investigation to collect the required data needed to perform a feasibility study. The feasibility study will evaluate alternative remedial measures and approaches. These are followed by a detailed engineering design to select remedial measures. Post-closure maintenance and monitoring serve to ensure the continued effectiveness of the long-term remedial measures following their implementation.

In the case of the SCP Site, one of the IRMs will require a remedial investigation/feasibility study to characterize the stored hazardous substances in preparation for the performance of the initial remedial measures.

The feasibility study is designed to evaluate the alternative long-term remedial measures and approaches to cleanup of the site. The conclusions and recommendations presented here may be revised following performance of the remedial investigation.

7.2 Identification of Remedial Measures

Remedial measures may be categorized as initial remedial measures (IRMs), source control remedial measures, and offsite remedial measures.

7.2.1 Initial Remedial Measures

Initial remedial measures can begin before final selection of an appropriate remedial action if such measures are determined to be feasible and necessary to limit exposure or threat of exposure to a significant health or environmental hazard and if such measures are cost-effective. Factors that should be considered when determining whether initial remedial measures are appropriate include actual or potential direct contact with hazardous substances by nearby population; absence of an effective drainage control system; contaminated drinking water at the tap; hazardous substances in containers above the surface posing a serious threat to public health or the environment; serious threat of fire, explosion, or other serious threat to public health or the environment; or weather conditions that may cause substances to migrate, posing a serious threat to public health or the environment (NCP, p. 31216).

Two (2) initial remedial measures will be implemented at the SCP Site. They are:

- Post warning signs
- Sample and remove hazardous materials.

The first IRM is necessary to keep unauthorized personnel off the property. The site is fenced on three sides (all but the Peach Island Creek boundary) by an industrial chain link fence. The gate is padlocked by the NJDEP; however, along the Paterson Plank Road side of the site, there are numerous signs posted by real estate brokers offering various size parcels of the property. These signs could attract potential buyers and perhaps tempt them to climb over or squeeze through the fence. It is unlikely that anyone would attempt to enter from the Peach Island Creek side; however, a few

signs should be posted there. In general, the public should be warned away from the site's fences because of the fire and explosion hazard.

The second IRM is critical to all future cleanup work at the SCP Site. In order to safeguard the local community, it will be necessary to remove the materials that pose the most imminent hazard.

The first step in this IRM is the deliberate sampling and analysis program that will be conducted by the removal contractor prior to disposal of tank contents. The cleanup contractor will sample every container in the field in order to determine disposal methods and locations. The cleanup contractor will then remove materials that are highly flammable or that are in leaking or damaged containers. Tanks or containers in good condition will probably be left on site if they pose no immediate danger to site workers or nearby residents. The completion of this IRM precludes the need for a waste sampling task in the Remedial Investigation.

7.2.2 Source Control Remedial Measures

Source control remedial measures may be appropriate if a substantial concentration of hazardous substances remains at or near the area where it was originally located and inadequate barriers exist to retard migration of substances into the environment. Source control remedial measures may not be appropriate if most substances have migrated from the area where originally located or if the lead agency determines that the substances are adequately contained. Source control remedial measures may include alternatives to contain the hazardous substances where they are located or eliminate potential contamination by transporting the hazardous substances to a new location. Criteria that should be assessed when determining whether source control remedial measures should be considered include the extent to which substances have migrated or are contained; the experiences and approaches used in similar situations; and environmental effects and welfare concerns.

The following criteria are used to determine the most suitable source control remedial measures:

- Status of containment and extent of offsite migration
- Extent of the threat to public health and welfare and environmental quality
- Intended use of the site
- Relative technical feasibility and cost-effectiveness of alternate measures
- Relative impact of alternative measures on public health and welfare, and environmental quality
- Past experience and approaches in similar situations.

In this case, the chief threat to public health and welfare and environmental quality is posed by existing contamination of Peach Island Creek and potential contamination of groundwater. The site is a valuable property, and is likely to be developed upon completion of the cleanup operations.

Although a definitive assessment of the extent of the site contamination must await the results of the remedial investigation, several preliminary conclusions may be drawn on the basis of available information:

- Contamination of the surface water and the sediment in Peach Island Creek adjoining the site may have occurred as a result of past direct spills and continuing runoff from the ground surface.
- Some contamination of the soil and groundwater may have occurred as a result of infiltration of spills and precipitation.

Consequently, the following source control remedial measures may be investigated for the SCP Site:

- Surface Controls

  In order to control contamination of groundwaters and surface waters, surface controls such as surface capping, revegetation, or runoff diversion/collection structures may be necessary. These low-permeability barriers would prevent infiltration of precipitation into contaminated soils.

- Groundwater Controls

  Slurry walls or grout curtains could be used to prevent contaminated groundwater from moving offsite, if there is a suitable continuous confining layer beneath the site.

- Leachate Collection and Treatment

  If leachate is found to be a problem at the site, a leachate collection and treatment system could be constructed.

- Removal of Contaminated Soil and Waste

  Contaminated soil and waste might be removed from the site, to be disposed of in a secure approved site. Liquid and semi-solid wastes presently located in tanks, tank trailers, drums, and on the ground will be collected. Removal and disposal methods will depend on the type and extent of contamination and will be determined based on the results of analytical testing and laboratory studies.

7.2.3 Offsite Remedial Measures

When contamination has migrated beyond the area where the hazardous substances were originally located, offsite remedial measures may be appropriate to minimize and mitigate the migration and its effects. These actions may be taken when the lead agency determines that source control remedial measures might not effectively mitigate or minimize a significant threat to public health, welfare, or the environment. Criteria that should be assessed when determining whether offsite remedial measures should be considered include contribution of the contamination to an air, land, or water problem; the extent of migration and whether continued migration might pose a danger to public health, welfare, or the environment; the extent

to which natural or man-made barriers currently contain the hazardous substances; and the experiences and approaches used in similar situations.

Selection of suitable offsite measures is governed by a set of criteria very similar to that used in selecting source control measures:

- Status of containment
- Nature and extent of current and potential migration
- Extent of the threat to public health and welfare and environmental quality
- Relative technical feasibility and cost-effectiveness of alternative measures
- Relative impact of alternative measures on public health and welfare, and environmental quality
- Past experience and approaches in similar situations.

Assessment of the extent of offsite contamination and the selection of suitable offsite measures must await the results of remedial investigation. However, several preliminary conclusions may be drawn on the basis of available information:

- Contamination of the surface water and the sediment in Peach Island Creek downstream from the site may have occurred as a result of past direct spills and continuing runoff from the ground surface.
- Contamination of the groundwater aquifer may have spread over a large area.

Consequently, the following offsite remedial measures are proposed for further investigation at this stage:

- Dredging and removal of contaminated sediments

  The presence of contaminants in the waters and sediment of Peach Island Creek or further downstream could necessitate the dredging and removal of the contaminated sediments.

- Treatment of Contaminated Groundwater

  Contaminated groundwater could be pumped to the surface and treated, treated in-situ by biological degradation, or treated by a combination of these methods.

7.3 Remedial Investigation/Feasibility Study

Remedial investigations and feasibility studies are required for the design and implementation of both the initial and the long-term remedial measures. The scope of the initial remedial investigation and feasibility study was delineated in Section 7.2.1. The sections below address the more sophisticated versions required for the design and implementation of the long-term remedial measures.

7.3.1 Remedial Investigation

Design and implementation of long-term source control and offsite remedial measures for the SCP Site require a thorough remedial investigation, because very little data has been collected thus far. The principal objectives of the investigation should be to assess the extent of contamination of the soil, groundwater, surface water (including sediment) resulting from past spills of hazardous substances and continuing surface runoff and to characterize the site, the waste, the environment, and the potential receptors in sufficient detail to permit the performance of a thorough feasibility study.

The proposed remedial investigation has been divided into 21 tasks, which are described in detail in Appendix B. The tasks to be addressed during the remedial investigation are as follows:

Initial Activities

- Prepare RI Work Plan
- Project Management
- Community Relations Support Functions
- Collect and Evaluate Additional Existing Data
- Perform Health, Safety, and General Site Reconnaissance
- Acquire Permits, Right-of-Entry, and Other Authorizations
- Procure Subcontractors
- Property and Topographic Survey
- Develop Site-Specific Health and Safety Requirements
- Develop Site-Specific Quality Assurance Requirements

- Develop Site-Specific Operations Plan
- Mobilize Field Equipment

Site Remedial Investigation Activities

- Ground Survey
- Soil Sampling
- Surface Water and Sediment Sampling
- Geophysical Investigations
- Subsurface Investigations
- Groundwater Monitoring
- Data Reduction and Evaluation
- Identify Preliminary Remedial Technologies
- RI Report and FS Work Plan

7.3.2 Feasibility Study

An engineering feasibility study will be conducted at the SCP Site to identify and evaluate remedial measures and prepare a conceptual design of the selected alternative(s). The feasibility study will be based on existing site information and information obtained during the remedial investigation. A draft feasibility report will be prepared which evaluates several remedial alternatives. The lead agency will use this report as the basis for selecting the remedial measure to be implemented. A conceptual design will then be prepared for the selected remedial measure(s).

A total of 6 tasks have been identified for the proposed feasibility study. These tasks, which are described in detail in Appendix B, are as follows:

- Develop Alternatives
- Screen Alternatives
- Laboratory and Field Studies
- Evaluate Remedial Alternatives and Prepare Preliminary Report
- Develop Conceptual Design (of Selected Remedial Measure)
- Final Feasibility Study Report

7.4 Future Remedial Activities

7.4.1 Remedial Measure Design

Design of the selected remedial measure will include the development of detailed construction plans and specifications. The design will be based on the findings of the remedial investigation and the feasibility study.

Remedial investigation reports will be companion documents to the design. These reports will contain site information needed for construction such as test boring logs, borehole testing data, groundwater conditions, soil, waste, and rock sample descriptions, and the results of analyses.

The design plan will include the following:

- Site topographic map with ground control data
- Detailed drawings of selected remedial action
- Typical geologic and design cross sections
- Typical design details
- Design report with supporting calculations
- Erosion and sedimentation control plan
- Construction health and safety plan
- Cost estimates
- Schedules
- Specifications
- Permit requirements

7.4.2 Remedial Measure Implementation

The lead agency will review the design and select a contractor through the government procurement process. Once construction is started, the lead agency will assume or contract for construction inspection and contract administration.

7.4.3 Long-Term Maintenance and Monitoring

Maintenance and monitoring will be conducted to determine the long-term effectiveness of the remedial measures implemented at the site.

Maintenance procedures will depend on the specific remedial measures implemented at the site. Maintenance might involve regular inspection of the monitoring wells plus any remedial earthwork.

Monitoring will consist of collection and analysis of samples from monitoring wells and the adjacent creek. The frequency and duration of sample collection and the parameters to be analyzed will be based on results of the remedial investigation and the monitoring program itself as it progresses. The monitoring program should be reviewed on a regular basis.

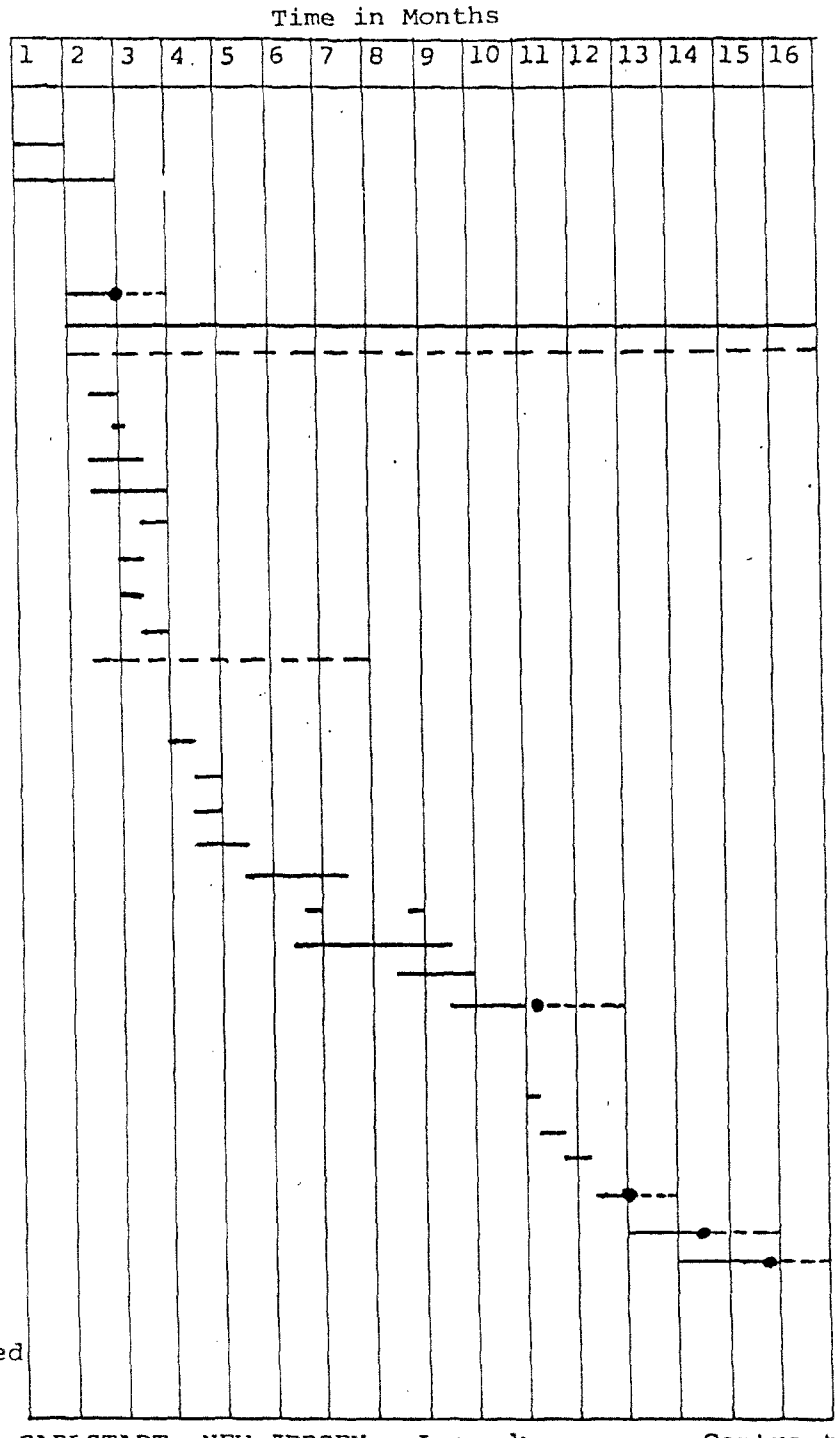
7.5 Master Site Schedule

The schedule for the implementation of all remedial activities recommended for SCP Site is shown in Figure 7-1. This schedule begins following lead agency approval of this RAMP and work authorization from the lead agency to an approved contractor.

It is emphasized that the schedule in Figure 7-1 is only a preliminary planning schedule, and it should only be used for general planning purposes.

7.6 Cost Summary

The costs for the initial remedial measures, the remedial investigation, and the feasibility study are shown in Table 7-1. Remedial response design and implementation costs and post-closure maintenance and monitoring costs will be estimated during the engineering feasibility study.



INITIAL REMEDIAL MEASURES

1. Post Warning Signs
2. Sample & Remove Hazardous Materials

REMEDIAL INVESTIGATIONS

Initial Activities

1. Prepare RI Work Plan
2. Project Management
3. Community Relations Support Function
4. Collect & Evaluate Additional Existing Data
5. Perform Health, Safety & General Site Recon.
6. Acquire Permits
7. Procure Subcontractors
8. Property and Topographic Survey
9. Health/Safety Requirements
10. Quality Assurance Requirements
11. Operations Plan
12. Mobilize Field Equipment

Site Remedial Investigation Activities

13. Ground Survey
14. Soil Sampling
15. Surface Water/Sediment Sampling
16. Geophysical Investigations
17. Subsurface Investigations
18. Groundwater Monitoring
19. Data Reduction & Evaluation
20. Identify Preliminary Remedial Techniques
21. RI Report & FS Work Plan

FEASIBILITY STUDY

22. Develop Alternatives
23. Screen Alternatives
24. Lab & Field Studies
25. Evaluate Remedial Alts./Preliminary Report
26. Conceptual Design
27. Final FS Report

REMEDIAL ALTERNATIVE DESIGN

REMEDIAL ALTERNATIVE IMPLEMENTATION } To Be Determined

POST-CLOSURE MAINTENANCE/MONITORING

FIGURE 7-1: REMEDIAL ACTION SCHEDULE, SCP SITE, CARLSTADT, NEW JERSEY Legend: ——— Contractor Activity
-------- Periodic Activity
• Regulatory Agency Review

TABLE 7-1

SCIENTIFIC CHEMICAL PROCESSING SITE, CARLSTADT, NEW JERSEY
PLANNING COST ESTIMATES FOR REMEDIAL ACTIONS
(JANUARY 1983 DOLLARS)

A.	Initial Remedial Measures	
	1. Install Warning Signs	
	a. Total IRM	$5,000
	b. CLP Analysis	0
	2. Sample and Remove Hazardous Materials	
	a. Total IRM	780,000
	b. CLP Analysis	0
B.	Remedial Investigation	
	1. Total RI	347,000
	2. CLP Analysis	76,000
C.	Feasibility Study	
	1. Total FS	77,000
	2. CLP Analysis	0
D.	Remedial Measure Design	*
E.	Remedial Measure Implementation	*
F.	Annual Maintenance and Monitoring	*

*These costs will be developed in the Feasibility Study

8.0 COMMUNITY RELATIONS ASSESSMENT

The following assessment is a preliminary judgment of the nature and extent of community involvement to date at the Scientific Chemical Processing Plant in Carlstadt, New Jersey, based on phone calls and file information obtained from EPA and the State of New Jersey. No onsite interviews by community relations personnel of either EPA or the contractor were conducted.

If necessary, the assessment will be revised to reflect new and updated information.

8.1 Community Relations History

Until recently, there has been very little documented evidence of community involvement in the SCP Site. This is probably due to several factors. The company has sites in Carlstadt and Newark, both of which have come under fire from State officials for violations of various permits. The Newark site, only 10 miles away, has received extensive media coverage and community interest. The Carlstadt site (SCP Site) is larger, but fewer chemicals are stored there--much of what has been stored has been transferred to the Newark site. The SCP Site is located in an industrial and commercial area. Although there is ground and surface water contamination, local residential water quality, in relation to the site, has not been an issue of the community.

The plant had operated for some time prior to a 1971 application to the Army Corps of Engineers for water discharge permits. The State of New Jersey began investigations of hazardous waste spills at the site in 1979. This was followed by continuing inspections and apparent environmental violations until, in October 1980, the State ordered the Carlstadt plant closed.

In January 1982, a State grand jury handed down indictments of the executives of SCP on various charges relating to environmental law violations, including the disposal of chemical liquids into a municipal sewer system and the dumping of full drums of chemicals into

a municipal landfill. A Federal Court found SCP and its officials guilty of all charges in January 1983.

In May 1983, the State of New Jersey filed suit against the company and its executives to require them to remedy the environmental violations at the SCP Site. Negotiations on this action are continuing.

Because of these latest developments, residents and business leaders of Carlstadt are aware of the potential danger in their community. There is concern for safety and health of the residents. A sports complex, industrial park, restaurants, and a major highway located near the site, have caused concern for the welfare of people who travel and work in the area.

The contamination of ground- and surface water near the site has also become a concern for residents in the area.

Recently, the site and its potential impact on the environmental integrity of the area became an issue in the Mayoral race (September 1983). This issue heightened community interest in and awareness of the site.

8.2 Issues and Concerns

The concerns of local residents and business leaders are presently expanding. There is concern for the safety of those travelling and working near the site because of the flammability and explosivity of some of the chemicals that have been handled at the plant. There is also concern for the water quality of a nearby stream that was used for plant discharges, and there is concern for the impact of runoff and plant spills on groundwater quality.

A further and overlapping concern is for the safety of spectators and participants--including animals--at the sports complex that is located near the site.

8.3 Community Relations Objectives

The primary objective of a community relations program must be to provide factual information to the community on the potential impact

of this site on the community as well as alternative procedures being developed for control and clean up of the site. This, however, cannot be accomplished until a comprehensive list of community and business leaders and their concerns is developed.

8.4 Community Relations Techniques

The following techniques are recommended to implement the objectives outlined in Section 8.3.

Objectives	Techniques
To develop a comprehensive list of community and business leaders.	Contact local elected officials, business leaders, and citizen leaders to compile necessary information for a mailing list.
To establish effective communication with local officials and provide them with information on site activity before such information is released to the press.	Conduct briefings of local officials. Issue fact sheets.
To develop information on community concerns.	Monitor local media sources for information on community reactions to the activities at the site. Meet with small groups to establish information channels between technical personnel and the community leaders.
To provide factual information on the site and the procedures being developed for remedy of the situation.	Develop fact sheet on the history of the site, including legal involvement to date. Develop fact sheet on technical alternatives being studied to remedy the situation. Meet with local officials, nearby business establishments, and community leaders to provide them with factual information. Establish contact with media representatives and provide them with contact telephone numbers and a press kit before onset of site work. Establish a convenient repository for fact sheets and other pertinent information.

Objectives	Techniques
To provide opportunities for community members to contribute input on site activities and to comment on remedial alternatives.	Conduct public meetings.

8.5 Interested Parties

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Senator Frank R. Lautenberg
372 Senate Russell Office Building
Washington, DC 20510

Home Office:
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Newark, New Jersey 07102 (201)645-3030

Mayor Dominic Presto
Carlstadt, New Jersey 07072

Bergen County Utilities Authority

Hackensack Meadowlands Development Commission

Tenants of Carlstadt Industrial Park

Media:

Bergen Record

Star-Ledger
Newark, New Jersey

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APPENDIX A

SITE CHRONOLOGY

November 8, 1971	Scientific Chemical Processing, Inc. (SCP), forwarded application to Department of Army Corps of Engineers for a permit to discharge waste into Peach Island Creek, Carlstadt, New Jersey. (SCP-01-004)*
February 7, 1977	Field Investigation Report on Scientific Chemical Processing, Inc., prepared by George Smajda. (SCP-03-008)
March 31, 1977	Memo from George Smajda on Scientific Chemical Processing, Inc., field investigation. The Investigation Report stated that several liquid spills and solid wastes were in contact with the ground. About 20-30 barrels were observed leaking. Soil samples were taken for chemical analysis. (SCP-03-007)
June 22, 1977	Memo from George Smajda on Scientific Chemical Processing, Inc., field investigation of this date. The memo stated that the spillage observed on March 31, 1977 had been mostly cleaned up. (SCP-03-006)
August 9, 1977	Memo from George Smajda on Scientific Chemical Processing, Inc., site investigation. He reported that there had been some spillage at the site, which occurred during the normal operational and handling procedures. The spills from the damaged drums stored at the site had been partially cleaned up. (SCP-03-005)

*Numbers in parentheses following each item description are document identification numbers assigned by Resource Applications, Inc.

CHRONOLOGY
SCIENTIFIC CHEMICAL PROCESSING, CARLSTADT, N.J.

April 28, 1978	Carlstadt Sewerage Authority, N.J., granted SCP permission to discharge waste indicated in their application of 4/25/78, subject to requirements of the Bergen County Utilities Authority. (SCP-01-004)
January 19, 1979	Field information on SCP Site compiled by Cahayla-Wynne and Tan. Samples were collected from cooling water discharge, south bank of creek, spills near the thin-film evaporator, and north bank of creek. (SCP-03-003)
January 22, 1979	Rich Cahayla-Wynne and Mox Tan of NJDEP describe their hazardous waste spill inspection and chain of custody sampling of 1/19/79 at SCP Site in a memo to Bob Reed. (SCP-01-005)
May 19, 1979	George Smajda of NJDEP, accompanied by Mack Barnes and Herb Case of SCP, conducted an inspection of the SCP Site. (SCP-01-006)
April 10, 1980	George Smajda of NJDEP, accompanied by Mack Barnes of SCP, conducted an inspection tour of the SCP Site. (SCP-01-007)
June 27, 1980	Letter from Herbert C. Case, Jr., of Scientific Chemical Processing, to Dr. Ralph Pasceri, Chief, Bureau of Hazardous Wastes, NJDEP. Inventory of chemicals of Carlstadt Plant, as of June 25, 1980, was also enclosed. (SCP-01-002)

CHRONOLOGY
SCIENTIFIC CHEMICAL PROCESSING, CARLSTADT, N.J.

October 10, 1980	NJDEP ordered to stop operations at their Carlstadt facility. (SCP-01-012)
April 1, 1981	Ralph Pasceri of NJDEP reviewed and responded to Carl Wing on SCP's proposal for clean-up of the Carlstadt site. (SCP-01-012)
December 1, 1981	Memo from Ralph Pasceri, Chief, Bureau of Hazardous Wastes, NJDEP, to Lawrence E. Stanley, Deputy Attorney General, suggesting that Olsen and Hassold's attorney may review the records. (SCP-03-002)
May 12, 1982	Letter from John Bolan of Hackensack Meadowlands Development Commission (HMDC) to Barbara Greer of Regulatory Affairs, NJDEP, for requirements from NJDEP for the investigation and clean-up of the SCP Site, Carlstadt, N.J. (SCP-02-001)
June 18, 1982	Three officials of SCP were indicted on charges of dumping chemicals down a sewer that emptied into Upper New York Bay. (SCO-01-001)
June 28, 1982	Documentation Record for Hazardous Ranking System was prepared. (SCP-01-011)
June 29, 1982	Metal Analyses (Test Report No. SR6926) submitted to NJDEP, Solid Waste Division, by Stablex Reutter, Inc. (SCP-01-008)
July 20, 1982	Letter from John Bolan of HMDC to Keith Onsdorff of Division of Waste Management, NJDEP, describing his failure to get a response to his letters of May 12, 1982 & June 25, 1982 to Barbara Greer of NJDEP. (SCP-02-003)

CHRONOLOGY
SCIENTIFIC CHEMICAL PROCESSING, CARLSTADT, N.J.

August 5, 1982	Site Inspection Report for Scientific Chemical Processing, Inc., prepared by NJDEP. (SCP-01-010)
August 12, 1982	Letter with copies of the EPA Inspection Form, HRS Documentation Form, and HRS Rank/Worksheet for 42 hazardous waste sites sent from Richard Katz of Division of Waste Management, NJDEP, to John Frisco of Hazard Assessment Section, EPA, Region II, NY.
September 9, 1982	Memo from Ferdinand Metzger of NJDEP to David Henderson on Background, Enforcement and Remediation Recommendations pertaining to SCP Site, Carlstadt, N.J. (SCP-02-005)
March 16, 1983	Memo from David Reger, Deputy Attorney General of N.J. to Jonathan Berg of NJDEP on SCP. Attached to the memo are the copies of manifests of 55-gallon drums at the SCP Site. A copy of memo from Jonathan Berg to David Reger of March 9, 1983 was also enclosed with this document. (SCP-03-001)

APPENDIX B
WORK PLAN OUTLINES

This appendix contains the work outlines and descriptions for the initial remedial measures, remedial investigation, and feasibility study for the SCP Site in Carlstadt, New Jersey. These outlines are preliminary and subject to change as more information comes to light and additional analyses are performed. The work plans are presented in two sections.

B.1 Initial Remedial Measures

B.2 Remedial Investigation and Feasibility Studies

B.1 Initial Remedial Measures

Following is the preliminary work plan outline for the initial remedial measures (IRMs) proposed for the SCP Site:

IRM-1 Installation of Warning Signs Around Site Perimeter

Remedial Investigation

Task 1 - Conduct Site visit to determine the locations of proposed warning signs.

Feasibility Study

None required.

Design

Task 1 - Prepare specifications for sign construction including size, materials of construction, color, and wording.

Task 2 - Determine numbers of signs required, based on proposed locations.

Implementation

Task 1 - Manufacture the signs according to specifications.

Task 2 - Install signs in selected locations.

IRM-2 Sampling and Removal of Hazardous Materials

Remedial Investigation

Task 1 - A cleanup contractor will be hired to sample all containers and remove materials as necessary.

Task 2 - The contents of all tanks, trailers, and drums will be sampled by cleanup contractor personnel, and analyzed on site in their mobile laboratory facilities.

Feasibility Study

Task 1 - The optimum removal method and disposal location will be determined for the contents of each container.

Design

None required.

Implementation

Task 1 - Remove and dispose of contents as determined.

B.2 Remedial Investigation and Feasibility Study (RI/FS)

Following is the preliminary work plan outline for the Remedial Investigation and Feasibility Study (RI/FS) to be conducted at the SCP Site. Not provided in this preliminary work plan are Health and Safety or Quality Assurance Plans, which will be provided in the detailed work plan to be submitted by the contractor following project authorization by the lead agency.

Section 1, Work Plan Summary; 2, Problem Assessment; 4, Management Plan; and 5, Costs and Schedule will be developed by the contractor in the detailed work plan. Only outlines for these sections are presented. Preliminary tasks have been outlined for Section 3, Technical Approach. Greater detail will be provided by the contractor in the detailed work plan.

1.0 WORK PLAN SUMMARY

1.1 Objective of Remedial Investigation/Feasibility Study

1.2 Scope of Work

1.3 Manpower Estimate and Costs

1.4 Schedule

2.0 BACKGROUND INFORMATION

2.1 Site History and Description

2.2 Nature and Extent of the Problem

2.3 Previous Investigation and Evaluation of Existing Data

2.4 Proposed Response

3.0 TECHNICAL APPROACH

3.1 Introduction

The purpose of the remedial investigation/feasibility study (RI/FS) at the SCP Site is to characterize the type and extent of soil, groundwater, and surface water contamination, and to identify and evaluate long-term remedial responses. The RI/FS has been divided into two major phases:

- Remedial Investigation
- Feasibility Study

The two phases have been subdivided into a total of 27 detailed tasks for the purpose of budget control and scheduling.

3.2 Remedial Investigation

The Remedial Investigation tasks have been divided into initial activities and site activities.

3.2.1 Initial Activities

Twelve tasks constitute the preliminary Remedial Investigation activities. These activities are required before the site Remedial Investigation can be initiated.

Task 1 - Prepare Remedial Investigation Work Plan

A detailed Work Plan will be prepared to define the project organization, task assignments, personnel and resource requirements, project schedule, budget costs, procurement, interface, and training requirements. Revisions might be required following lead agency review and comment.

Task 2 - Project Management

Management will be provided by the Remedial Planning Office (REMPO) Regional Coordinator and the Project Manager. Their involvement will continue through the duration of the Remedial Investigation and Feasibility Study, and will include such work as manpower allocation, scheduling, budget monitoring, and other administrative and reporting duties as necessary.

Task 3 - Community Relations Support Functions

Community relations support will be provided by the contractor at the request of the lead agency and may include logistical support for the planning and execution of the activities at the SCP Site and technical support to ensure that all information is accurate and current.

Because of the nature of public involvement, community relations input must be flexible to accommodate fluctuations in public interest. Community relations input must also remain flexible to dovetail with technical progress at the site.

Task 4 - Collect and Evaluate Additional Existing Data

It will be necessary to collect and evaluate additional information which was not available for the preparation of this work plan. This information will help fill data gaps. Possible sources of information include:

- State and local agencies dealing with the environment, health, or natural resources
- USGS and State geological survey
- Climatological and hydrologic data, including flood plain maps
- Soil Conservation Service soil and agricultural data
- Academic studies from local colleges or universities
- Local well drilling companies
- Local water company

- Aerial photographic contractors
- Local historical societies
- Local newspapers

Data obtained from these or other sources will be used to assist in the investigation.

Task 5 - Perform Health, Safety, and General Site Reconnaissance

The investigation team will conduct a reconnaissance and inspection to assess potential health and safety hazards. The team will locate physical hazards and features on a preliminary field plan drawing and oriented to a field plan grid system.

Onsite and perimeter areas will be considered. The site, nearby terrain, and downgradient surface water discharge areas will be inspected visually for contamination, including signs of water poluttion, vegetation stress, and effects on wildlife.

Obvious waste characteristics will be documented, including the location and physical condition of tanks, tank trailers and noticeable spills or migration paths.

Topographic and surface conditions, soils, geology, air, and surface water information will also be recorded. Evidence of buried wastes, such as surface disturbances, will be noted.

Much of this information might be available from records accessible at this time. However, verification of the data, updating site conditions, and retrieval of additional information will be required.

Before any onsite work is undertaken, air sampling will be performed to determine the possible effects of airborne contaminants on the health of site workers and nearby residents. Four stations will be sampled over an 8-hour period. One station will be upwind of the site, one will be downwind, and two will be on site. A detailed survey may involve the following instrumentation at each air sampling station:

- A continuous, high-volume particulate sampler.

- Total hydrocarbon analyzer equipped with a flame ionization detector and thermal desorber.

Gas emission sampling can be done using suction pumps with flow meters. The pumps can provide a flux rate from a few milliliters to 4 liters per minute. The accurate flow rate is measured by a soap bubble meter at the outlet of the pump.

The absorbent collector is made of stainless steel or glass tubes (1/4 inch O.D.), which contain two sections of Tenax (60/80 mesh) separated by glass wool. Tenax tubing is chosen to absorb the volatile organics components in the air. The back section is used to monitor breakthrough. Each section is approximately 4 centimeters long. Because commercially available Tenax contains some priority pollutant impurities such as benzene and toluene, the Tenax must be baked and proven free from organic impurities before sampling begins. In addition to the basic equipment, a particulate filter mounted inside a cassette may be needed if the particulate material is dense enough to clog the sampling tubes. The optimum air sampling rates are 8 to 9 liters/3 hours for the tubes, and 1.7 to 2 liters/minute for the cassette.
It will be necessary to record the following weather parameters at the site during sampling.

- Wind direction and speed
- Temperature
- Humidity
- Barometric pressure

This data will be used to help interpret air quality data and to determine the level of protection necessary for onsite work. During the long-term or site clean-up activities, additional air monitoring may be needed. Monitoring equipment will be set up near the office trailer.

Task 6 - Acquisition of Permits, Right-of-Entry and Other Authorizations

Each proposed monitoring well will require a permit issued by the New Jersey Department of Environmental Protection Division of Groundwater Management.

Tax records will be examined to determine ownership of the SCP Site and surrounding properties. Any right-of-way or utility easements will also be determined.

The need for Right-of-Entry to the SCP Site or surrounding properties, or other permits or authorizations, will be identified and acquired by the contrator.

Task 7 - Procure Subcontractors

Competitive bids will be solicited from prequalified firms for each task to be subcontracted. The process of advertising for and evaluating bids will begin upon receipt of EPA authorization. The contractor will review the bids and select the subcontractor. The EPA Contracting Officer will review and approve the subcontractor selection prior to award of the subcontracts.

The following elements of work are under consideration for subcontracting:

- Property survey, topographic survey, ground control, and grid survey
- Borings and monitoring well installation
- Geophysical surveys

Task 8 - Property and Topographic Survey

A property survey will be conducted to delineate the SCP Site property line. A topographic survey will then be conducted to provide a topographic base map for the remedial investigation and long-term responses, a grid layout for sampling and geophysical activities, and horizontal and vertical location of proposed monitoring wells.

Property Survey

Existing property records at the Bergen County Courthouse and Carlstadt Township offices will be examined and a survey crew will locate pertinent property line monumentation in the field. Office calculations will establish the "field truth" location of the SCP Site property, and property corners will be set. Existing surveys will be used wherever possible.

Aerial Photography and Ground Control

The contractor or approved subcontractor will establish horizontal and vertical ground control as required by the aerial photography subcontractor.

The site will be flown, in suitable weather and visibility, by the contractor or approved subcontractor. Specific flight parameters such as speed, number of flight lines, photographic exposure interval, and flight altitude will be controlled by the photogrammetrist to provide for a proper and completely finished topographic map, covering an area of approximately 100 acres. The area to be mapped includes the SCP Site property and surrounding lands.

The topographic map will be a single-scribed, double matte, 3 mil washoff mylar with reversed image. The map will have a horizontal scale of 1 inch = 50 feet and a contour interval of 2 feet.

Monitoring Well Survey

Following the installation of new monitoring wells, all wells will be located horizontally and vertically with respect to the site grid and datum. These evaluations and locations are necessary to determine the hydrogeologic conditions of the site.

Task 9 - Develop Site-Specific Health and Safety Requirements

Site-specific health and safety requirements will be developed for the SCP Site. This purpose of the plan will be to:

- Provide minimum safety protection requirements and procedures for onsite field crews and subcontractors.
- Ensure adequate training and equipment to perform expected tasks.
- Provide ongoing site monitoring to verify preliminary safety requirements and revise specific protection levels as required.
- Protect the general public and the environment.

Task 10 - Develop Site-Specific Quality Assurance Requirements

A quality assurance plan will be developed for the SCP Site. The plan will address the 16 basic elements required by EPA (Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. EPA Document No. QUAMS-005/80, December 29, 1980.) and will refer to or include site-specific details on sampling; field testing; surveying; chain-of-custody; sample handling, packaging, preservation, and shipping; and record-keeping and documentation. Analytical requirements will be given along with any other procedures needed for the remedial investigation or feasibility study.

Task 11 - Develop Site-Specific Operations Plan

A Site Operations Plan will be developed for the SCP Site. The plan will address the logistics involved in performing the Remedial Investigation, and will include the Health and Safety and Quality Assurance Requirements established in Tasks 9 and 10.

The Site Operations Plan will detail the type of personnel involved in each task, the type and amount of field equipment needed, and the type and number sample bottles and equipment needed. Sampling methodologies and analytical techniques will be discussed in detail.

Procedures for shipping and handling of equipment and sample bottles will also be developed. Quality assurance and health and safety information will be summarized. Other items that are specific to the SCP Site may be added in the final plan.

Task 12 - Mobilize Field Equipment

The equipment needed during the remedial investigation will be mobilized by the contractor or subcontractor. The following equipment might be needed at the SCP Site during the remedial investigation:

- Field office trailer
- Surveying equipment
- Resistivity/conductivity equipment
- Seismic equipment
- Sampling tools and equipment
- Health and safety equipment
- Decontamination equipment
- Groundwater monitoring equipment.

Equipment will be stored on-site in a secure field office trailer. The placement of the trailer will be specified in the site-specific Health and Safety Requirements. The existing office and garage buildingson the site will be inspected for possible use instead of office trailers.

3.2.2 Site Remedial Investigation Activities

The purpose of the RI is to gather site-specific information concerning the type and extent of contamination so that appropriate remedial responses can be identified and evaluated during the Feasibility Study.

A total of 9 tasks has been identified during the site Remedial Investigation phase.

Task 13 - Ground Survey

A baseline will be established onsite for the purpose of providing horizontal control for resistivity survey, soil sampling, and waste location. The baseline will run northwest-southeast along Paterson Plank Road and will be approximately 560 feet in length. Stakes will be provided and labeled at 100-foot intervals. The grid will cover an area of approximately 5.9 acres.

Points for the vertical electrical soundings will also be surveyed at this time. Wooden stakes will mark the 8 proposed locations.

Task 14 - Soil Sampling

The actual areas where spillage occurred are not known. The potentially contaminated area is about 5 to 6 acres. A grid sampling system is proposed to help define the extent of soil contamination at the site. Sampling locations will be on approximately 100-foot centers. At each sampling location, soil samples will be collected at the surface, and at depths of 6 inches, 1 foot, and 1-foot intervals thereafter to the water table. The surface samples will be taken by trowel, while the subsurface samples will be taken with a split spoon sampler. In the locations where it is not possible to position a drill rig, samples will be taken with a hand-operated power auger.

Soil samples will also be taken in any area where a spill is discovered. Also included will be samples taken from the storage tank area as well as control samples taken in an area where there has been no spillage from the tanks or tank trailers.

Cost-effectiveness precludes running the entire priority pollutant protocol on the large number of soil samples needed to characterize the extent of soil contamination. It is felt that the indicator parameters will be adequate to define the extent of contaminated soil if every tenth sample is analyzed for the Hazardous Substances List as a standard. Soil samples will be analyzed for the following parameters:

- Hazardous Substances List (every 10th sample)
- Total organic carbon (TOC)
- Total organic halogens (TOH)
- Metal indicators: Arsenic, Aluminum, Copper, Chromium, Iron, Lead, and Zinc
- Oil and grease

Task 15 - Surface Water and Sediment Sampling

Onsite Surface Water

Peach Island Creek will be sampled on two different occasions, which will be timed to correspond with other field sampling tasks. On each occasion, a minimum of three water samples will be taken from the creek and analyzed for the following parameters:

- Hazardous Substances List
- pH
- Total organic carbon (TOC)
- Total organic halogens (TOH)
- Acidity/alkalinity
- Sulfate, chloride, cyanide
- Total kjeldahl nitrogen (TKN)
- Oil and grease

A minimum of three sediment samples will be taken from the bottom of the creek, at the same locations as the water samples. The sediment samples will be analyzed for the following parameters:

- Hazardous Substances List
- Total organic carbons (TOC)
- Oil and grease

Offsite Surface Water

Both aqueous and sediment samples will be taken from the offsite surface water in the vicinity of the SCP Site. A sample will be taken from Peach Island Creek at its confluence with Berrys Creek Canal. A sample will also be taken from Peach Island Creek upstream from the site.

Only one sampling of offsite surface water is recommended. The water samples will be analyzed for the following parameters:

- Hazardous Substances List
- pH
- Total organic carbon (TOC)
- Total organic halogens (TOH)
- Acidity/alkalinity
- Sulfate, chloride, cyanide
- Total kjeldahl nitrogen
- Oil and grease

The sediment samples will be analyzed for the following parameters:

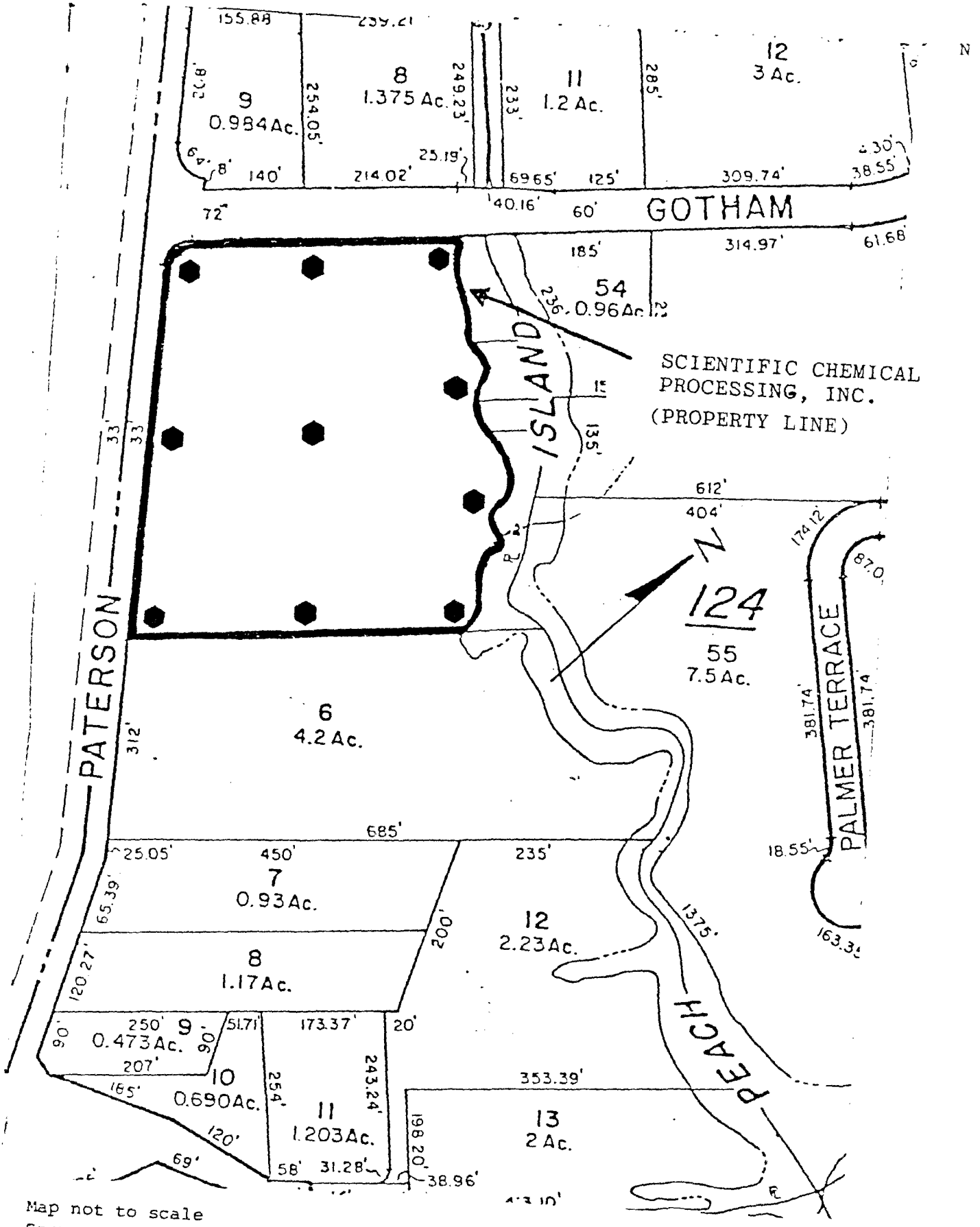
- Hazardous Substances List
- Total organic carbons (TOC)
- Oil and grease

Task 16 - Geophysical Investigations

A resistivity survey will be conducted at the SCP Site to determine the depth to groundwater and the presence of water bearing zones in the till and bedrock. This investigation will be performed prior to monitoring well installation (Task 17). In this way, the hydrogeologist will have more information available to him in order to best locate the boreholes.

Resistivity surveys require the performance of vertical electrical soundings (VES). Vertical electrical soundings will be taken at approximately 10 locations in order to determine the depth to groundwater and to determine the presence of water-bearing zones in the bedrock. Soundings will be made near proposed monitoring well locations as well as along the borders of the property (Figure B-1).

An electrical current is injected into the ground by a pair of electrodes on the surface. The resulting potential field is measured between a second pair of electrodes. Resistivity can then be calculated from the electrode separation distance, the applied current, and measured voltage.



Map not to scale
Source: NJDEP

Legend: ● Resistivity Survey Points

Figure B-1: Proposed Locations of Geophysical Investigations at SCP Site, Carlstadt, NJ

VES are obtained by calculating the resistivities that result from progressively greater electrode spacings, which allow greater depths of penetration.

Task 17 - Subsurface Investigations

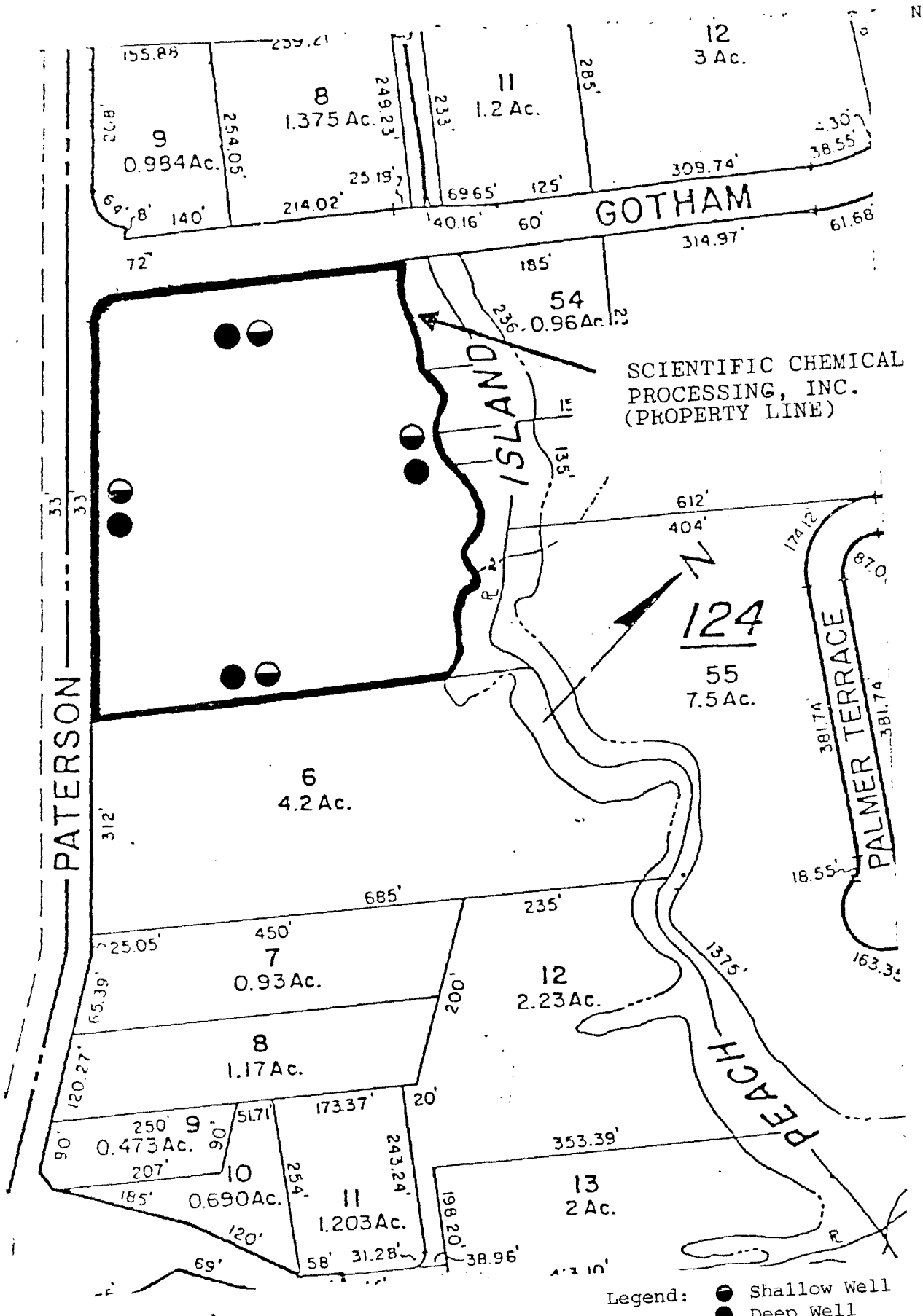
The determination of the nature and extent of the groundwater contamination and groundwater flow direction are the primary objectives of this investigation. A detailed groundwater investigation will provide the background information to determine the presence or absence of a contaminant plume in the shallow aquifer (22- to 40-foot depth) and the deeper aquifer (212- to 225-foot depth). Chemical contamination of the unsaturated zone will also be defined. The work to be performed during this program includes:

- Soil sampling
- Monitoring well installation
- Well development
- In-situ hydraulic conductivity testing and water level management.

Drilling Program

A program of drilling and monitoring well installation is planned to quantify the extent of contamination in the aquifer and provide information about the confining layers that separate the aquifers. The proposed drilling program consists of eight borings (Figure B-2). Four of the borings will be shallow and will be completed in the uppermost sand and gravel layer. Four other borings will go through the clay layer and will be completed in the underlying sand and gravel aquifer.

The drilling and construction of all wells will be performed under the continuous supervision of an experienced hydrogeologist. The deep monitoring wells that penetrate the confining layer will be installed so as to minimize the possibility of contamination of the deeper aquifer by way of the casing wellbore annulus. All borings



Map not to scale
Source: NJDEP

Figure B-2. Proposed Location of Installing Monitoring Wells at SCP Site, NJ

will be located horizontally and vertically and referenced to the site datum and grid.

The proposed drilling program may be modified based on the resistivity survey and on the identification of any contaminants present in the groundwater.

Drilling Operations

Shallow boreholes will be advanced using hollow stem augers at locations and depths where their use is practical. The auger shall have an inside diameter large enough to allow the installation of four-inch monitoring wells. The use of CME-type, or equivalent, hollow stem augers (6-1/4-inch inside diameter) is recommended. At locations or depths where augers are not practical, other drilling techniques will be used.

Deep boreholes will be advanced using rotary or percussion (cable tool) methods. A 10-inch minimum diameter borehole should be drilled into the confining layers, conductor casing set to this depth, and the casing cemented into place. Below the conductor pipe, the borehole should be 7-7/8 inches in diameter.

Soil Sampling

Soil samples will be obtained during borehole advancement for the purpose of defining site stratigraphy. Split-spoon samples will be taken continuously from the ground surface with the standard penetration test.

A portable organic vapor analyzer (OVA) will be used to scan selected soil samples.

Shallow Monitoring Well Installation

Shallow monitoring wells will be 4-inch nominal diameter and constructed of PVC or steel wellscreens and riser pipe. Wellscreens will be 5 feet long and sections of pipe will have threaded connections.

Screens and riser pipes will be installed in the completed boreholes, and the annular space around the well screens will be backfilled with clean, coarse sand to 2 feet above the top of the well screen, if the natural soils do not collapse as the augers are pulled back. A layer of bentonite pellets 5 feet thick will be placed above the sand pack.

The annulus between the well and borehole walls will be filled with cement and bentonite grout. The grout will be placed with tremie pipe placed to just above the top of the bentonite layer. The grout will be pumped through this pipe to the bottom of the annulus until undiluted grout flows from the hole at the ground surface. A protective steel casing will be placed over each monitoring well.

Deep Monitoring Well Installation

Deep monitoring wells will be 4-inch nominal diameter and will be constructed of PVC or steel conductor pipe, well screen, and riser pipe. Well screens will be 10 feet long. Pipe sections will have threaded connections.

The conductor pipe will be installed in the 10-inch diameter borehole. This pipe will then be cemented into place using the positive displacement method wherein cement and bentonite grout is forced under pressure into the borehole-casing annulus.

Screen and riser pipes will be installed in the completed boreholes. The annular space around the well screens will be filled with clean, coarse sand to 2 feet below the base of the confining layer. A layer of bentonite pellets will be placed in the annulus to about midway through the confining layer. The remainder of the annulus to the surface will be filled with cement and bentonite grout emplaced using a tremie pipe. A protective steel casing will be placed over each monitoring well.

Development of Monitoring Wells

Monitoring wells will be developed immediately after they are installed by pumping or bailing the well water with a laboratory-cleaned pump assembly or bailer. Removed water will be collected for suitable treatment or disposal. Water will be removed from the well until it is free of visible sediment.

In-Situ Hydraulic Conductivity Testing and Water Level Measurement

In-situ hydraulic conductivity tests of saturated materials will be performed after well development. Water will be bailed or pumped out of the well and the rate of water level rise will be measured. These tests are commonly called bailing tests or rising head tests. Water levels in all wells will be measured periodically to accurately define groundwater flow direction.

Sampling

Dedicated airlift pumps will be provided for each well. The well head will have a quick-disconnect coupling for the air input and a 1-1/2- or 2-inch (I. D.) discharge pipe for the water outlet. An air compressor equipped with appropriate air cleaning filter system will be used to purge the well. The air lift discharge water will be collected for suitable treatment or disposal.

When the water levels have recovered sufficiently, enough water will be removed with a bailer to fill all required sample bottles. If the well is incapable of producing a sufficient volume of samples, the largest quantity available will be taken and recorded in the log book.

A dedicated bailer will be provided with each new monitoring well for sample retrieval.

Cleaning

To reduce the risk of transfer of contaminants onto the surface and around the site, all drilling and soil sampling equipment will be decontaminated prior to its use onsite and after each boring is complete. Specific decontamination procedures will be outlined in the Quality Assurance and Sampling Plan.

Task 18 - Groundwater Monitoring

All eight monitoring wells will be sampled after installation and development. The samples will be analyzed for the following parameters:

- Hazardous Substances List
- pH
- Total organic carbon (TOC)
- Total organic halogens (TOH)
- Acidity/alkalinity
- Oil and grease
- Specific conductance

A second round of groundwater samples will be collected approximately two months after the initial sampling. The samples will be analyzed for the same parameters as the first round. The purpose of the second round of analyses is to verify the extent and magnitude of groundwater contamination determined by the first round of analyes.

The five wells in the vicinity of the SCP Site used for potable water will also be sampled and analyzed for the indicated parameters.

Task 19 - Data Reduction and Evaluation

Upon completion of the remedial investigation, all field and laboratory data will be evaluated to prepare a complete site assessment. The report will delineate the types and extent of surface water, groundwater, and soil contamination. Existing standards will be reviewed to formulate conclusions and recommendations regarding the hazard potentials at the site.

Task 20 - Identify Preliminary Remedial Technologies

The identification process for remedial technologies will take into account the type of media contamination, the site-specific conditions (soils, geology, etc.), public health and safety concerns, and existing EPA and NJDEP regulations. One or more appropriate remedial technologies will be grouped together as required to constitute the remedial measure.

The remedial measures listed below represent a preliminary list of options based on the existing site information. The list may be reduced or augmented, depending on the results of the site investigation. The prime remedial measures identified at this time include:

- Surface Controls
  Highly contaminated soils may be covered with impermeable material to prevent surface water infiltration.

- Groundwater Controls
  Slurry walls or grout curtains may be employed to prevent contaminated groundwater from moving offsite.

- Leachate Collection and Treatment
  A leachate collection and treatment system could be constructed to prevent groundwater contamination.

- Removal of Contaminated Soil and Waste
  Wastes in drums and highly contaminated soils may be removed from the site and disposed of in a secure, approved landfill.

- Dredging and Removal of Contaminated Sediments
  If highly contaminated sediments are found during the sampling program, they may be excavated and disposed of at an approved waste handling site.

- Treatment of Contaminated Groundwater
  Contaminated groundwater could be pumped to the surface, treated, and either injected to the groundwater or discharged to Peach Island Creek.

- No Action
  The no-action or minimum action alternative assumes that no remedial measures will be implemented to mitigate onsite and offsite contamination. This action must be evaluated in terms of the health and environmental consequences it poses as well as the resulting economic considerations.

Task 21 - Remedial Investigation (RI) Report and Feasibility Study (FS) Work Plan

After completion of the field investigations, all pertinent field and laboratory data will be assembled into a detailed report of the RI. This report will include detailed descriptions of the following items:

- Objectives of the RI

- A description of the study area, including soil type and depth, as well as the results of the laboratory testing

- Geologic framework and subsurface geologic conditions in the vicinity of the site

- Hydrogeologic conditions at and in the immediate vicinity of the site, including the depth to groundwater and the rates and directions of groundwater flow

- Groundwater and surface water quality in the vicinity of the site

- Transport of the wastes by surface water in the vicinity of the site

- Extent of containerized waste and spillage at the site

- Supporting data, such as chemical analysis reports, boring logs, and monitoring well water-level readings

- Conclusions and recommendations of the study.

Maps, figures, and tables will be prepared to support the text.

A Work Plan will be prepared for the FS. The Work Plan will present a detailed schedule and budget for the activities to be undertaken. The major tasks of the Feasibility Study are as follows:

- Develop alternatives
- Screen alternatives
- Perform laboratory and field studies
- Evaluate remedial alternatives
- Develop conceptual design
- Prepare final report

3.3 Feasibility Study

The purpose of the Feasibility Study is to evaluate appropriate remedial measures and prepare a conceptual design of the selected alternative. The Feasibility Study will be based on existing site information and information obtained during the remedial investigation. A total of six tasks is required.

Task 22 - Develop Alternatives

This task will serve a two-fold purpose--to establish remedial response objectives and to identify remedial alternatives.

To evaluate the effectiveness of remedial measures, the goals and objectives of site remediation must be clearly defined. These goals and objectives may include the determination of the degree of

remediation required to mitigate adverse effects and the determination of maximum contaminant levels that may be used as criteria for defining the physical limits of treatment requirements of various remedial alternatives. The results of the remedial investigation will identify the extent of contamination in the area around the SCP Site.

Criteria will be established to evaluate the various remedial measures. Evaluation of the remedial measures must comply with regulations of the EPA and the State as well as the requirements of the National Contingency Plan.

The selection of objectives for evaluation of remedial actions must be based on public health protection and on site-specific conditions. A set of preliminary objectives has been established for evaluation of remedial action alternatives. These objectives include the following:

- Public Health and Safety Assurance

  This includes protection of local residents, field crews, and others from the chemical and physical damage hazards of the site. These hazards include inhalation, oral and dermal toxicities, and explosion and fire potentials. Both short- and long-term hazards must be considered.

- Surface Water Protection

  The migration of wastes caused by surface water run-off and erosion must be controlled.

- Groundwater Protection

  The degradation of existing and potential drinking water supplies must be addressed.

- Air Quality Protection

  The release of contaminants into the air during all phases of remedial action will be addressed.

All possible remedial actions that fit the established objectives will be developed in detail. The list in Task 21 may be either expanded or shortened. The contractor will then be able to screen the likely alternatives.

Task 23 - Screen Alternatives

Each potential remedial alternative will be screened to determine how well it meets the Remedial Investigation objectives.

The evaluation criteria must provide a standard by which the suitability of the candidate remedial measures can be judged. The evaluation criteria may include, but will not be limited to:

- Technical Reliability/Environmental Effectiveness
- Implementability
- Operation and Maintenance (O&M) Requirements
- Cost
- Institutional Factors

Factors implicit in the evaluation of remedial measures include: availability and cost of materials required for final construction; physical site limitations to construction activities; applicability of treatment technologies to the waste materials; long-term effectiveness of the remedial measure; long-term operation and maintenance (O&M) requirements, transportation requirements; and additional exposure hazards to the environment and public created by implementation of a remedial measure. All onsite and offsite remedial measures will be evaluated in comparison to a risk assessment associated with a no-action alternative.

Based on site-specific conditions, some evaluation criteria may be weighted more heavily than others. These criteria would be identified during the Remedial Investigation phase. The evaluation criteria will be reviewed with the EPA and the New Jersey Department of Environmental Protection.

Task 24 - Laboratory and Field Studies

After the Remedial Investigation has been completed and the remedial alternatives have been identified, it may be necessary to conduct pilot or bench-scale treatability studies. This work would include any studies required to evaluate the effectiveness of remedial technologies to establish engineering criteria necessary for design and implementation.

Because these studies are linked directly to the prior performance of tasks listed above, a separate Work Plan for any proposed treatability studies will be submitted to the lead agency for approval.

Task 25 - Evaluate Remedial Alternatives and Prepare Preliminary Report

Evaluation and ranking of the candidate measures will result in presentation to the lead agency of the most desirable alternatives. The remedial alternatives will be evaluated for each project objective using the final criteria developed after review of the Remedial Investigation findings. The evaluation will be conducted according to criteria outlined in Section 300.68 of the National Contingency Plan.

Evaluation and ranking of each remedial measure for each project objective will be performed through a decision matrix. A ranking system will be developed in which each remedial measure will be given a value for each criteria, such as from 1 to 100, with 1 the least desirable and 100 the most desirable in relation to all methods.

The criteria can be weighted to reflect a ranking within a group. For instance, costs or implementability might carry more weight than technical feasibility and would be given a higher relative ranking number. Decisions about the definition and ranking of evaluation criteria will be made before the remedial measure evaluation during the review meetings with the lead agency.

All information specific to the remedial measure evaluation and feasibility will be summarized and presented in a separate report.

This report, together with the remedial investigation report, will be the basis for the conceptual design of the selected remedial measure.

Information to be included in the Preliminary Feasibility Report will include:

- Supporting references on the feasibility of the remedial measures chosen for evaluation
- Specific procedures and supporting data used to rank each remedial measure for the evaluation criteria
- Design calculations used in evaluating each remedial measure
- Preliminary design drawings and sketches used to evaluate each remedial measure
- The cost estimates for each remedial measure with appropriate references provided.

The report will be prepared in a format that will be agreed upon in the preliminary review meetings. All documents collected in the remedial measure evaluation will be organized in a project file and will be available for later reference.

The report will be reviewed by the lead agency and then with the public at a community meeting. Following this the lead agency will select the remedial measure for implementation.

Task 26 - Develop Conceptual Design of Selected Remedial Measure

A conceptual design of the selected remedial measure will be prepared for use in development of detailed construction plans. The design will be based on the findings of the Remedial Investigation and the remedial measures evaluation.

The conceptual design plan will include general arrangement drawings. The site investigation report will be a companion document with the conceptual design plan. This report will contain site information needed for construction design, such as test boring logs, borehole testing data, groundwater conditions, and soil, waste and rock sample descriptions and analyses.

The conceptual design plan will include the following:

- The selected engineering approach with implementation schedule
- Any special implementation requirements
- Applicable design criteria
- Preliminary site layouts
- Budget cost estimates including operation and maintenance cost figures
- Operation and maintenance requirements
- Safety plan including costs
- Equipment and construction functional specifications

Any additional information required as the basis for the completion of the final remedial design will also be included.

Task 27 - Final Feasibility Study Report

A final report shall be prepared for submission to the lead agency. The report, structured to enable the reader to cross-reference with ease, shall include the results of Tasks 13 through 23, and will include additional appended information.

Appended information may include but will not be limited to:

- Site topographic map with ground control data
- General arrangement drawings of remedial measure
- Typical geologic and design cross-sections
- Typical design details
- Design report with supporting calculations
- Erosion and sedimentation control plans
- Construction health and safety plans
- Preliminary cost estimates

4.0 MANAGEMENT PLAN

This activity occurs throughout the remedial investigation/feasibility study. General tasks of this activity include establishment of project records; review meetings with the lead agency; preparation of monthly reports; ongoing monitoring of remedial investigation staffing, budgets, and subcontractor performance; and maintaining quality assurance programs.

4.1 Project Organization and Staffing

4.1.1 Project Manpower Plan

4.1.2 Interface Requirements

4.1.3 Field Office Operations

4.2 Project Reports

4.2.1 Project Status Reports

4.2.2 Interim, Draft, and Final Reports

4.3 Procurement

4.4 Change Orders

4.5 Community Relations

4.6 Quality Assurance

4.7 Health and Safety

5.0 COSTS AND SCHEDULE

5.1 Project Schedule

5.2 Costs and Budget

TABLE C-1
SCIENTIFIC CHEMICAL PROCESSING SITE - CARLSTADT, N.J.
COST ESTIMATES FOR INITIAL REMEDIAL MEASURES
(JANUARY 1983 DOLLARS)

A. IRM-1 Install Warning Signs	
1. Remedial Investigation	
a. Total RI	1,000
b. CLP Analysis	0
2. Feasibility Study	
a. Total FS	0
b. CLP Analysis	0
3. Design	1,000
4. Implementation	3,000
B. IRM-2 Sample and Remove Hazardous Materials	
1. Remedial Investigation	
a. Total RI	70,000
b. CLP Analysis*	0
2. Feasibility Study	
a. Total FS	10,000
b. CLP Analysis	0
3. Design	0
4. Implementation	700,000

*Analyses to be performed onsite by cleanup contractor.

TABLE C-2
SCIENTIFIC CHEMICAL PROCESSING SITE - CARLSTADT, N.J.
REMEDIAL INVESTIGATION/FEASIBILITY STUDY DIRECT COST TABLE
(JANUARY 1983 DOLLARS)

	I. INITIAL ACTIVITIES	II. SITE INVESTIGATION	III. FEASIBILITY STUDY
TOTAL HOURS	2102	2734	1640
TRAVEL & LIVING	$9,000	$11,000	$1,000
OTHER DIRECT COSTS	$9,000	$12,000	$3,000
SPECIAL EQUIPMENT	$4,000	$1,000	0
SUBCONTRACTS	$10,000	$62,000	0
CLP ANALYSIS	$5,000	$71,000	0

TABLE C-3
SCIENTIFIC CHEMICAL PROCESSING SITE, CARLSTADT, NEW JERSEY
REMEDIAL INVESTIGATION/FEASIBILITY STUDY COST SUMMARY
(JANUARY 1983 DOLLARS)

	REMEDIAL INVESTIGATION	FEASIBILITY STUDY
DIRECT LABOR	$66,000	$24,000
TRAVEL AND LIVING	20,000	1,000
OTHER DIRECT COSTS	21,000	3,000
SPECIAL EQUIPMENT	5,000	0
SUBCONTRACTS	72,000	0
INDIRECT COSTS AND FEE	131,000	42,000
SUBTOTAL	315,000	70,000
CONTINGENCY (10%)	32,000	7,000
TOTAL (excluding CLP)	347,000	77,000
CLP LAB ANALYSIS	76,000	0